



A Guideline to support Primary Groundnut
Producers with GAP Auditing

Good Agricultural Practice Audit Guidelines for Groundnuts

Compiled and Distributed by:
The South African Groundnut Forum &
Oilseeds Advisory Committee

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WHAT IS THE PURPOSE OF THIS GUIDE?

This is not a production manual, but rather a reference tool, supporting farmers with the process of establishing and maintaining GAP records and physical evidence required for official audits as prescribed in the *Standards Regarding Food Hygiene and Food Safety of Regulated Agricultural Food Products of Plant Origin intended for Export (Government Notice No 707 of 13 May 2005)*.

Whilst considering the objectives outlined in *Codex Alimentarius* standards, the main purpose is to address the guidelines in the official GAP Audit Compliance Criteria Checklist.

Keep in mind that this manual is meant as a guide only and that there might be areas that does not apply to your operation or which could be replaced by existing procedures or records in place in your operation. You might otherwise find that you need to adjust or even expand on this guideline to ensure that your farm meets the audit or specific market requirements.

Although the utmost care has been taken in the compilation of this guide, the responsibility for compliance remains solely with the primary producer and no accountability should be assigned to any government body, agent or industry related organisation.

THE SUPPLY OF SAFE GROUNDNUTS BEGIN ON THE FARM

THE SUSTAINABILITY OF MARKETS, LOCAL AND ABROAD ARE IN THE HANDS OF PRIMARY PRODUCERS ... THE REST OF THE PROCESSING AND SUPPLY CHAIN, HOWEVER IMPORTANT, ONLY HAVE LIMITED RISK MITIGATION OPTIONS AVAILABLE IF THE

It is strongly recommended that the Audit Checklist as well as the Compliance Criteria documents referred to and included herein are studied carefully, not only to ensure compliance and for in-house auditing, but to make use of the valuable information and guidance supplied therein.

WHAT YOU WILL FIND IN THIS GUIDE

- Good Agricultural Practice information specific to groundnut farming and food safety.
- A set of templates and standards designed specifically to meet the record requirements set by the Audit Compliance Criteria and Checklist. These are only examples and should be adjusted by the producer where deemed necessary. Not all of the templates or examples is necessarily critical to pass the GAP audit, although some might support documentary, training or risk assessment evidence requirements.
- Compliance Criteria, Notes and Management Aids: Primary Production and On-farm produce Handling (Groundnuts) : R707 of 13 May 2013
- Audit Checklist: Primary Production and On-farm produce Handling (Groundnuts) : R707 of 13 May 2013
- Recommended Standards and Codes of Practice - Codex Alimentarius:
 - Recommended International Code of Practice – General Principles of Food Hygiene (CAC/RCP 1 – 1969, Rev 4-2003)
 - Code of Practice for the prevention and reduction of aflatoxin contamination in peanuts. (CAC/RCP 55)
- Agricultural Chemical list for use on Groundnuts in South Africa
- Producer Stock Grading Guideline
- Suggestions for Training and Risk Assessment

CONSIDERING THE RISKS



Aflatoxin contamination of groundnuts in the field is the result of adverse environmental conditions, such as inappropriate temperature, drought, precipitation, relative humidity and insect infestation during specific growing stages of the crop. Farmers have

minimal control over the occurrence of some of these environmental factors.

Appropriate pre-harvest

and harvest management practices, including crop rotation, irrigation, timed planting and harvesting as well as the use of pesticides, are the best methods for preventing or controlling aflatoxin contamination. Timely harvesting could reduce crop moisture to a point where the formation of mold

would not occur. Moreover, the minimum damage of shells during mechanized harvesting of the crop significantly reduces the contamination risk of pods.

Other major food safety risks come from different sources of

APPROPRIATE PRE-HARVEST AND HARVEST MANAGEMENT ARE THE BEST METHODS FOR PREVENTING & CONTROLLING AFLATOXIN AND OTHER CONTAMINATION.

contamination: foreign objects, microbial and chemical residues.

With the proper protocols and

training, these risks can be managed and reduced to a very large extent.

In addition to limiting the risk of aflatoxin and contamination, effective GAP application has proven benefits in overall crop quality, yield and profitability – not

MAJOR AFLATOXIN CONTRIBUTING FACTORS

- Use of damaged or compromised seed.
- Delayed harvesting after physiological maturity.
- Damage to pods during harvesting.
- Retention of high moisture in pods and inappropriate handling thereof.
- Inadequate protection from pests, diseases and water stress.
- Poor harvesting, handling and storage practices.

only for the specific crop, but also in terms of broader farm activities and cultivation.

IN SHORT...RECOMMENDED BEST PRACTICE FOR PREVENTION AND REDUCTION OF AFLATOXIN IN GROUNDNUTS:

To be effective, pre-harvest control of aflatoxin contamination must take into consideration the varied environmental and agro-nomic factors that influence pod and seed infection by aflatoxin producing fungi. Factors will vary considerably between locations and seasons and some areas may be particularly favourable to

fungal infection and contamination and should be carefully considered for the cultivation of groundnuts. However, in most cases it should be possible to reduce aflatoxin risk through well managed agricultural best practice.

A.flavus/A.parasiticus
cannot grow or produce
aflatoxin at water activity <0.7;
relative humidity below 70%
and temperature between 0 &
10°C

Codex Alimentarius CAC/RCP 55-
2004

Pre-Harvest

Crop rotation and soil type	• Continued cultivation of groundnuts on the same field may lead to build up of high population of aflatoxin producing fungus. • Lighter, sandy soil favour rapid proliferation of fungi, particularly under dry conditions. • Heavier soils have a higher water holding capacity with less likelihood of drought stress contributing to aflatoxin risk.
Soil Condition	• Soil tests could indicate the need for fertilizer and other applications to support plant health and resistance.
Cultivar Choice	• A cultivar should be chosen that is suitable for the growing conditions of the particular area and show resistance to factors such as insect, microbial and fungal attack. • Growing season should allow for harvesting at optimum maturity and favourable harvesting and drying weather.
Irrigation/Water	• Irrigation could minimize pre-harvest aflatoxin and should be applied evenly to ensure all plants on the field have adequate supply of water at similar conditions. • Water for irrigation and chemical application should always be of suitable quality.
Optimum Plant Ratio	• Overcrowding should be avoided by maintaining recommended row and intra-plant spacing. • Too high a population may lead to drought stress, poor development or ineffective application of pesticides.
Weed & Pest Control	• Excessive weed growth may deplete available soil moisture. • Insect damage and fungal infection may be limited by the effective and responsible use of chemical or biological products as registered for use on groundnuts. • Care should be taken during cultivation and weed control to avoid damage to pegs and pods.

Harvest to Distribution

Training	Workers and employees involved in harvesting should be well trained and knowledgeable with regards to risk and hygienic practices.
Equipment	All equipment should be maintained, serviced and cleaned to ensure proper operation and limited risk to safety and quality – both for workers and produce.
Harvesting	- Plan to harvest at full maturity, unless allowing the crop to mature fully will subject it to undue environmental risk such as extreme heat, drought or rainfall. - Maturity is an important factor, as high levels of over-mature or very immature kernels can result in higher occurrence of aflatoxin.
Segregation	- Areas on the field which might yield plants/pods that could hold a specific higher risk than the rest of the field should be considered for segregation and special management (e.g. harvesting plants separately that died from attack by pests, pathogens or disease. Also plants that were waterlogged during the last stages of the crop or during the harvesting/drying period.) - In cases of irrigation fields, any yield from plants that was not irrigated or fell outside the reach of the irrigation system should be harvested and delivered separately to avoid mixing of higher risk with lower risk product.
Limit damage to pods	- Damage to pods during harvesting should be avoided since this can lead to rapid invasion of the pods by <i>A. flavus</i>/<i>A. parasiticus</i>. - Pods and kernels should be handled as gently as possible throughout harvesting, drying, picking, storage and distribution.
Drying	- After harvesting pods should be exposed for maximum rate of drying. - Curing should be completed as soon as possible to a safe water activity so as to prevent the growth of microorganisms such as aflatoxin producing molds. - However, drying too rapidly may cause sun damage, loose skin, split kernels and off-flavours in kernels.
Transport & Storage	- Groundnuts should be moved to suitable storage or processing area as soon as possible after harvesting and/or drying. - Containers and vehicle loading surfaces used on farm and for delivery to next process should be: - Clean & Dry - Free from insects and fungal growth - Free from foreign material, including chemicals, oil, soil, plant parts or other commodity seed/kernels. - Consignments should be protected from any additional moisture, including condensation which could lead to aflatoxin development. - Rodent, bird and insect infestation should be avoided at all cost.

A number of factors influence the decision on when to cut a peanut crop, including:

- maturity of the crop
- peg strength and general crop health - if the crop is highly diseased the grower is advised to cut early to reduce harvest losses
- weather outlook - hasten or delay cutting if wet weather is imminent
- risk attitude of grower
- soil type differences may cause variations in maturity within a block
- machinery logistics and relating cost.



ASSESSING MATURITY

There are four major methods to assess crop maturity in peanuts:

Internal 'shell-out' method: pods are shelled and sorted into mature and immature categories based on the extent of blackening of the inner side of the shell wall. Consider the crop fully mature when the proportion of mature pods is above 95%. The shell-out method is the recommended method for dryland peanut growers to use.

Weeks after planting: this method is dependent on variety and location. It is not an accurate method because temperature differences and variations in patterns of drought stress during different years can lead to differences in maturity for the same variety of up to three weeks.

Hull-scrape method: scratch the external surface of pods using a knife and sort them into categories based on colour differences (white, yellow, orange, brown/ black). Once the proportion of brown/black coloured pods reaches 60-65% for Virginia types, and 65-75% for runner types, the crop is considered to be fully mature.

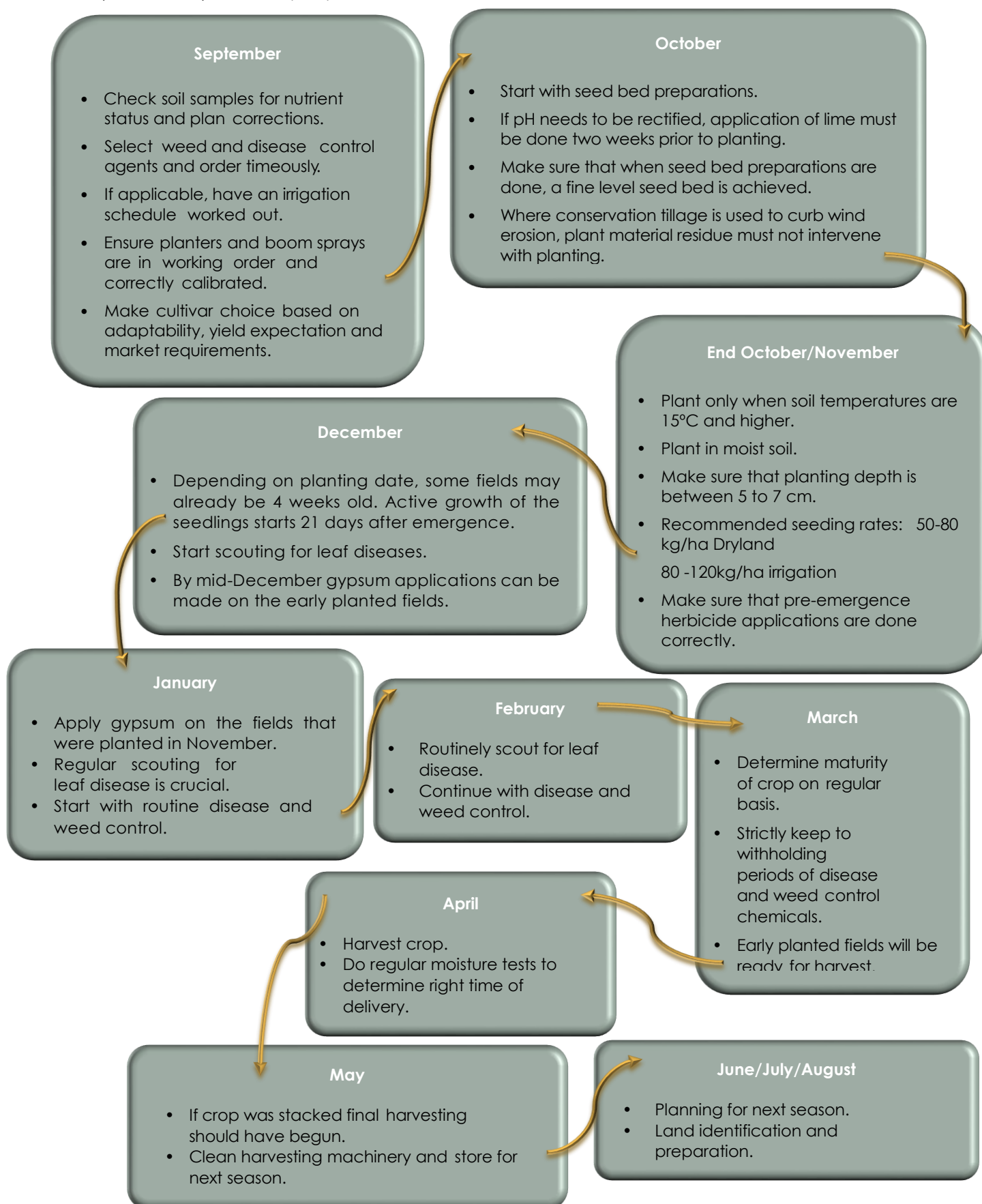
Thermal-time method: this method is based on the theory that a variety requires an accumulation of 'heat units' above a 'base' temperature of around 10°C. This method is experimental and is better suited for maturity prediction in irrigated crops.

Field and research experience shows that the hull-scrape and thermal-time methods of maturity assessment are the most reliable in irrigated situations where the pods tend to mature, or 'set', at the same time.

In dryland situations, crop water stress at different stages of crop growth can result in a range of pod setting events, spreading crop maturity over time. The internal shell-out method is a more reliable method to assess optimal maturity in dryland crops.

GROUNDNUT CROP CALENDER

As published by the ARC (2012)



PRODUCTION PRACTICES FROM THE GROUNDNUT SEED PRODUCTION MANUAL PUBLISHED BY ICRISAT (B R Ntare, AT Diallo, J Ndjeunga and F Waliyar)

Soil selection

Groundnuts require well-drained sandy loamy soils that facilitate penetration of the pegs after pollination, and easy digging without pod loss. Groundnut plants are sensitive to salinity, and high soil acidity (pH<5) could induce magnesium or aluminum toxicity. In this type of soil, calcium should be added to maintain the pH above 6.

Climatic conditions

Optimum temperatures for growing groundnuts range from 25°C to 35°C. Cooler temperatures, especially at night, prolong the growing cycle. Groundnuts are slightly sensitive to photoperiod. Although groundnuts are drought tolerant, good performance is strongly linked to adequate soil water content at sowing time, followed by well-distributed rainfall. Early maturing small-seeded varieties require 300-500 mm while the medium to late maturing large-seeded varieties need 1000-1200 mm rainfall.

Field isolation

Groundnuts are self-pollinating and therefore do not require isolation. A distance of 5-10 m between varieties is recommended to avoid mixing during harvesting and stripping.

Crop rotation

Groundnut fits into a wide range of farming systems. It can follow both cereals (maize, sorghum, pearl millet and sorghum) and root crops (cassava and sweet potatoes). Groundnuts does well on virgin land or immediately following a grass fallow or a well fertilized crop such as maize. Avoid groundnut on groundnut rotation to discourage the build-up of pest and diseases.

Land preparation

Removal of crop residues that spread diseases and harbor pests is important. For light soils, this type of cleaning should be followed by a shallow raking after the first light rains. This eliminates early weeds and breaks up the soil surface. In wetter areas or with heavier soils, fields must be ploughed at the beginning of the season to suppress weeds and break up the soil, which must then be refined by harrowing. With this soil type, raised-beds are often made to limit run-off or water logging. If groundnut is to be grown on ridges, the ridges should be made at or just before sowing, and should be flat-topped. If the soil is dry when the ridges are being made, a light rolling after ridging will help make the seedbed firm.

Fertilizer application

A reasonable level of organic matter must be maintained in light, weakly structured, tropical soils. The groundnut plant has an extensive root system that allows it to explore a large volume of soil and therefore benefit from organic residues from the preceding crop (cereal). Groundnuts can be cultivated with a balanced fertilizer N-P-K. Calcium must be added to slightly acidic soils to correct the pH and improve the quality of the seeds. Calcium deficiency leads to a high percentage of aborted seeds (empty pods) and improperly filled pods. Calcium is barely translocated across the leaves, and should therefore be applied near to the fruiting zone at the onset of pod formation. The recommended fertilizer rate depends on soil type and varies between 200 to 600 kg/ha of gypsum for large-seeded varieties

Sowing

Seed selection and treatment: Seed should be carefully prepared and sorted in order to eliminate skinned, immature, moldy, and small seeds and treated with an insecticide/fungicide mixture to control seedling blights caused by soil bacteria and fungi. The fungicide will control soil pests that damage seedlings.

Sowing: Planting date is linked to temperature, soil moisture and rainfall distribution in the area as well as the length of the crop season. Soil moisture must be sufficient to guarantee good germination. Seeds must not be sown immediately after heavy rains since they absorb too much water, which causes rotting. This also results in excessive soil compaction, which may hinder germination. In general early sowing improves yields (significant delay in sowing can reduce yield by 50%) and quality.

Plant spacing

Spacing depends on the growth habit and the variety. Small seeded Spanish types are spaced at 60 cm between rows and 10 cm between stations. This gives an optimum plant population of 167,000 per hectare. The large-seeded Virginia types are spaced at 75 cm between rows and 15 cm between stations, giving an optimum plant population of 89,000 per hectare. Under irrigation, plant population can be as high as 250,000 plants/ha.

Weed control

Groundnut cannot compete effectively with weeds, particularly at the early stages of development (3-6 weeks after sowing). Early removal of weeds reduces this competition. Crop rotation may also reduce certain species of weeds. Pre- and post-emergence herbicides may be used to eradicate and the crop should be thoroughly weeded within the first 45 days. Once pegging begins, soil disturbance should be avoided or kept to a minimum, so as not to interfere with the developing pods.

Harvesting

It is important to harvest groundnut at the right time, that is, when the crop is mature. Flowering is indeterminate in the groundnut; therefore there is a variable proportion of mature and immature pods at the end of the crop cycle.

Groundnuts are mature when 70-80% of the inside of the pods shells have dark markings and the kernels are plump, with color characteristic of that variety. If harvested prematurely, the kernels shrink upon drying, resulting in decreased shelling percentage, poor seed quality and lower oil content. If harvested late, non-dormant varieties will sprout in the field, resulting in yield losses.

Post harvest handling

Seed quality mainly depends on appropriate handling and storage techniques for the harvested crop. Handling facilitates the selection of the best seeds while storage conditions ensure the conservation of high seed quality. Groundnut seeds are protected by a shell, which acts as an excellent natural barrier against pests and diseases. However, this shell should be intact. Removal of damaged pods is therefore necessary. Crop residues mixed with the pods are often sources of contamination.

Picking

Pods are stripped at about 2 to 6 weeks after harvesting, when the pod water content stabilizes at around 10%. This operation consists of separating the pods from the vegetative parts of the plants.

Drying

The primary objective drying, is to achieve a rapid but steady drying of pods to avoid aflatoxin contamination. Plants should be staked in the field for a few days to allow them to dry in the sun and air, before stripping the pods. Then drying should be continued until the moisture content is reduced to 6-8%. This can normally be achieved by drying the bagged pods in the sun for 6-7 days. If pods are exposed to the sun too long, both kernel quality and seed germination will be affected.

Under mechanized farming systems, combine harvesters collect windrows, strip and clean pods in one single operation. The pods are then artificially cured in drying trailers. Airflow temperature should be 5-6°C above ambient temperature but should not exceed 35°C. Optimal depth varies from 0.6 to 3 meters according to pod water content and the type of curing equipment used.

Seed storage and conservation:

Groundnuts can either be shelled or stored in unshelled form. Groundnut is best stored unshelled in cool, dry conditions, protected from rain and vermin (particularly rats and mice). Bagged groundnuts—whether shelled or unshelled—should not be placed directly on a concrete floor due to the risk of dampness that may cause moulds to develop.

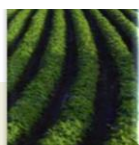
Shelled groundnuts are fragile and are exposed to various agents that cause physical, chemical and biological deterioration.

CHEMICAL USE RISK ASSESMENT, MANAGEMENT & TRAINING:

Minimising residues in agricultural produce

Ensure that you follow 'Best Practice' in the use of chemicals on the farm. There are five elements to consider:

- The chemical must be registered for the intended use & commodity.
- The rate of application and frequency as prescribed must not be exceeded.
- The 'Withholding Period' and 'Harvest Intervals' as indicated on the label must be followed without fail.
- Other specific directions on the label must be followed.
- Producer Industry Guidelines for the use of chemicals on export crops should be observed and adhered to.



Duty of Care

Employers

Be responsible for the safety of your employees, contractors and neighbours, the general public, consumers and the environment, before, during and after chemicals are used. This responsibility is at two levels:

- A statutory responsibility under current legislation.
- A common law 'duty of care' to ensure that no harm is done to yourself, any other person, or their property.
- Do not allow an employee or contractor to undertake a task that you know to be illegal or unsafe.
- Ensure that your employees are properly informed, instructed, trained and supervised in the safe use of chemicals.
- Ensure that information & systems are available so that chemicals can be used safely and without risks to health.
- Provide employees with instruction, training and supervision.

Employees

An employee working with or near chemicals has a responsibility to maintain safe work practices, to protect their own health and safety and that of others at the workplace as well as any produce. Employees must report promptly to their employer anything which in the employee's view may affect compliance with any relevant legislation.

- Use only pesticides registered and that are approved for the intended situation of use.
- Read the registered label on the pesticide container (or have them read to the user) and strictly follow the label directions.
- Do not risk injury to persons, property and non-target plants and animals through the use of the pesticide.
- Keep a proper record of pesticide stock and applications.
- Be trained.

Chemical Storage, Use & Training

PLEASE NOTE: Considering the scope of legislation and risk that comes with the storage and use of chemicals, it is strongly suggested that training is outsourced to a competent service provider that are duly registered and who will issue training certificates for your staff. It is very unlikely that GAP auditors will accept in-house training unless the person responsible for training is duly trained and registered and proper records of adequate training, training material/contents and attendance can be proven.

The following information is given as an indication of the factors that should be considered in a training program:

1. It should take into account literacy levels, work experience and specific skills required for the job.
2. It should be practical and hands-on where this is relevant. For example, hands-on training should be used for the use and fitting of PPE.
3. The following must have appropriate training:
 - workers who are required to store or use a chemical
 - workers who are supervising others working with a chemical
 - those who are required to work in close proximity to where chemicals are stored and used, or who may come into contact with hazardous residue
 - everyone likely to be involved in fire or emergency action
 - casual or seasonal workers who may use or come into contact with a chemical or residue – consider limiting the tasks performed by casual or seasonal workers as an alternative to providing a greater degree of training.

Where relevant, training should also cover:

- Recognising and interpreting the information on a label including:
 - safety directions and risk phrases
 - poison scheduling, dangerous goods and hazardous substances classifications and symbols
 - first aid and emergency procedures and special directions
 - application rates, compatibility and withholding periods for pesticides
- The importance of being able to:
 - know the parts of the label and the significance of the information in each part
 - extract and interpret information from a product label
 - relate the hazard to the poison schedule, dangerous goods classification and risk phrases
 - calculate the amount of pesticide to use to achieve the correct application rate
 - know how to obtain access to the MSDS, and the information each part of the MSDS can provide
 - understand selection, use, maintenance and storage of safety equipment required
 - follow work practice or procedure in any aspect of the use of a chemical in the workplace, including any appropriate regulation or code of practice to be followed
 - apply re-entry periods
 - prepare and appropriately use pesticide application record sheets and storage records
- The application of chemicals including:
 - selection of appropriate equipment
 - importance of accurate and even application
 - nozzle selection
 - calibration for efficient application and reduction of spray drift
 - calculation of the amount of pesticide to give the desired application rate
 - decontamination steps for equipment and clothing
 - disposal of waste
 - maintenance and cleaning of equipment
 - protection of others at the workplace
- Safety & Health:
 - protection of human life
 - potential for environmental damage
 - initial measures to establish control
 - decontamination
 - first aid or incident reporting procedures where injury or illness to other persons has occurred

Please also refer to additional guidance information supplied elsewhere in this publication.

LIST OF LEGISLATION...

...which may be used as reference, but might not be limited to:

LIST OF REGULATIONS AND EXPORT REQUIREMENTS AND STANDARDS APPLICABLE TO IMPORTATION AND EXPORT OF GROUNDNUTS ADMINISTERED UNDER THE AGRICULTURAL PRODUCT STANDARD ACT (ACT 119 OF 1990)

Agricultural Products Standard Act (Act 119 of 1990)

"To provide for control over sale and export of certain agricultural products, control over the sale of certain imported agricultural products; and control over other related products; and for matters connected to"

<http://www.nda.agric.za/doaDev/sideMenu/foodSafety/doc/Act%20119.pdf>

Local Regulation

Regulations for grading, packing and marking of groundnuts intended for sale in the Republic of South Africa. (R.966 of 7 October 2005)

http://www.nda.agric.za/doaDev/sideMenu/foodSafety/doc/localImportRegulations/gg28084_nn966%20-%20grondbone.pdf

Export Requirements and Standard

The Standards and Requirements regarding export of Groundnuts (No 608 of 9 September 2011) 2011-1.

http://www.nda.agric.za/doaDev/sideMenu/foodSafety/doc/agronomyExport/Groundnuts_Export_Standards_amendment2011.doc

http://www.nda.agric.za/doaDev/sideMenu/foodSafety/doc/agronomyExport/Grondbone_Standaarde2011.doc

http://www.nda.agric.za/doaDev/sideMenu/foodSafety/doc/agronomyExport/Groundnuts_Table_Amendment2011.doc

The Standard regarding food hygiene and food safety of regulated agricultural food products. (R707 of 13May 2005)

<http://www.nda.agric.za/doaDev/sideMenu/foodSafety/doc/english.doc>

Standard Operating Procedures

Standard Operating Procedure on Sampling and Analysis of Grains, Oilseeds And Groundnuts to determine Mycotoxin Levels and Risk Management as part of Export Inspection And Certification in terms of the Agricultural Product Standards Act (Act No. 119 Of 1990)

<http://www.nda.agric.za/doaDev/sideMenu/foodSafety/doc/Mycotoxin%20SOP%202012.doc>

Standard Operating Procedure on sampling and analysis of Agricultural Products of Plant Origin to determine Agro-Chemical Residue Levels and Risk Management as part of Export Inspection and Certification in Terms of the Agricultural Product Standards Act

<http://www.nda.agric.za/doaDev/sideMenu/foodSafety/doc/SOP%20-20SAMPLING%20METHODS.REP.doc>

Other:

- Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act 36 of 1947)
- Foodstuffs, Cosmetics and Disinfectant Act, 1972 (Act No 54 of 1972).
- Hazardous Substance Act, 1973 (Act No. 15 of 1973).
- Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).
- Environmental Conservation Act, 1989 (Act No. 73 of 1989).
- National Environmental Management Act, 1998 (Act No. 107 of 1998).
- The Standards Act, 1993 (Act No. 29 of 1993).



EXAMPLES OF POLICY AND PROCEDURES

The following documents can be used as guidelines or adapted for specific farm circumstances.

General Employee/Worker Health, Hygiene & Food Safety Policy

It is suggested that this or similar policy form part of a season training session with all workers/employees that will work with or come in contact with the groundnut crop and/or any cultivation operations pertaining thereto. To facilitate record keeping, the policy document can be dated and space added below for all workers/employees to sign as confirmation of training and acceptance of policy.

Control Measures and Chemical Use Training

This document make suggestions with regards to issues relating to responsible and safe chemical management, however the relevant legislation remains paramount and as advised earlier in the document, training and training material should be provided by a qualified person.

Standard Operating Procedure Worksheet

Not a requirement, but a handy tool that gives a general outline for a Standard Operating Procedure that could assist in the drawing up of specific SOP's for your farming operations.



General Employee/Worker Health, Hygiene & Food Safety Policy

(This manual only make suggestions with regards to certain aspects that should be addressed, however the relevant legislation must never be forgotten and compliance in all aspects should be ensured)

- All employees, workers and visitors to the location are required to follow proper health and hygiene procedures.
- People, especially those in direct contact with unprotected food products, must wash their hand before beginning with or returning to work (e.g. lunch breaks, use of ablution facilities etc.)
- Employees/workers should not wear jewelry in crop handling areas.
- Smoking, drinking and eating are not allowed while handling crop and should be confined to designated areas or well away from harvesting areas as to prevent contamination.
- Glass containers are under no circumstances allowed in the field or any other area where the crop is handled or stored.
- Employees/workers suffering from infectious conditions are not allowed to directly handle food products.
- Employees and workers must immediately report any possible contamination that come to their attention (including chemicals, foreign matter, body fluids, diesel/petrol, oil, spills or leaks etc.).
- Employees/workers are required to be ever watchful for foreign matter such as glass, metal, packing material, rocks, bones, personal effects, insects, rodents, parts of feces, etc. Any such matter should, where possible and practical, be removed and reported to a supervisor.
- Employees/workers stationed around equipment must know the location of the controls to safely start and stop machinery. A supervisor must be notified immediately if there are any unsafe conditions that may endanger workers or contaminate/damage crop.
- Any type of chemical container must be kept away from storage and crop areas, unless being handled by authorized and properly trained employees/workers.
- All employees or workers required to handle, prepare and/or apply chemicals must be properly trained on best practices, read and understood product labels and instructions, and if necessary, be certified in terms of local legislation.

Control Measures and Chemical Training

(This manual only make suggestions with regards to certain aspects that should be addressed, however the relevant legislation must never be forgotten and compliance in all aspects should be ensured)

It is suggested that these guidelines are used and displayed at the relevant station/s on the premises.

The purpose of control measures is to eliminate or reduce exposure to chemicals in the actual circumstances of use and storage. Also consider controls that reduce environmental impact, including the reduction of waste. The aim of the risk management of chemicals is to minimize or eliminate illness, injury and contamination by going through the following steps:

- identifying the chemical hazards
- assessing the degree of risk created by the chemical hazards, in storage and work processes
- eliminating risks, or if this is not reasonably practicable, determining appropriate measures to control risks including improving existing controls
- ensuring appropriate supervision of workers
- ensuring appropriate instruction, information and training is provided to workers
- recording any action or work procedure established for the workplace
- checking the implementation and success of control measures.

Administrative controls are planned work practices which enable you to manage risks. These include: the time of work, hours of work restrictions, taking wind and weather conditions into account, and restricting who does the work and who has access to a work area or chemical store. Administrative controls are implemented to ensure safe work practices are adopted in the workplace and that environmental impact is minimized.

Examples of administrative controls include:

- Reducing the number of persons exposed and excluding non-essential personnel from the area.
- Prohibiting eating, drinking and smoking when handling chemicals.
- Providing and ensuring the use of adequate facilities for effective decontamination such as washing facilities.
- Ensuring that outdoor tasks are done at the most appropriate time of day (e.g. wind drift or heat stress).
- Correctly calculating crop volume, area to be treated and amount of spray required. This has the added benefit of minimizing the amount used and costs.
- Correctly calibrating equipment.
- Restricting crop re-entry after application.
- Signs indicating hazards.
- Notification of neighbours.
- Establishing procedures for disposal of waste and containers.

The types of risks

Risk assessments should be made in the following three major areas:

- Risks to users from the preparation and use of chemicals, where the emphasis is on controlling contact.
- Risks to others from spray drift, contamination (eg crop re-entry) and disposal.
- Risks to persons, property and the environment by accidental events such as spillage or fire in storage or transport

MEASURES

Consider the advice in this section to check on your use of control measures and in training manuals and sessions.

To reduce risks from spray drift:

- Identify sensitive areas where spray drift is likely to have the greatest impact, such as water sources, occupied buildings, public roads, schools and other public amenities, livestock, crops and pasture.
- Separate the application site and the area of potential risk with a barrier, such as vegetation, or distance. For example, encourage vegetation growth to act as a barrier. Wherever possible, a buffer zone should be left between a sprayed and unsprayed area.
- Farmers should prepare property plans as a means of communicating to others all the factors that need to be considered when applying chemicals on a property. The plan should identify houses and farm buildings, neighboring properties, sensitive areas, roads and access points, public roads and public places, watercourses and storages, paddock boundaries, and in the case of aerial spraying, power lines and hazards such as transmitter towers. The property plan is both a tool for communicating with neighbours and a management tool when spraying contractors are used or employees given directions.
- Farmers should communicate with neighbours to minimize drift problems and to avoid conflict.
- Use a formulation or product (if available) which reduces spray drift, or alternative application method (if permitted by the label). Some formulations are more volatile than others. Low volatility formulations are preferable in areas where exposure to others nearby is possible, or where elevated temperatures may occur after spraying. Dust can ionize and suspend on a dry day, creating drift.
- Check wind speed and direction. Spraying should only take place when the breeze is blowing away from an area that may be at risk from drift.
- Choose equipment that is designed to reduce or eliminate drift (if permitted by the label instructions).
- Equipment should be used according to the manufacturer's instructions and be the most appropriate for the task in hand, for the particular pesticide and target requirements.
- For each type of application equipment, variables such as nozzle type, hydraulic pressure, height of delivery and the presence or absence of a directed airstream will affect the size and movement of droplets produced, and the efficiency with which they impact on the target. Application equipment needs to be set up to maximise pest control efficiency and to minimize spray drift.
- Spray volume should be controlled by changing nozzles and not by varying pressure. A higher pressure generally forms a finer spray that may drift excessively.
- Droplet drift before the pesticide hits the target is reduced if the release height is as low as possible. However, if the release height is too low it may be difficult to obtain a uniform spray pattern.
- Non-drip valves and recirculating systems should be used where possible. Pressure gauges should be maintained and functional. Ensure that the spray rig is calibrated accurately and frequently.
- Calibration and maintenance should be undertaken regularly and include checks of nozzle performance and wear, pressure, the accurate working of gauges and regulators, spray output, filters, and the speed of ground rigs.

Weather conditions:

- To minimize spray drift it is necessary to monitor weather conditions during and immediately after application. Without access to real time weather information in the vicinity of the target crop, aerial and ground based spraying should not be undertaken.
- Ideally, relative humidity should be high and temperature not greater than recommended for the product.
- Temperature affects the rate of evaporation, particularly water based sprays. Evaporation can reduce the size of droplets making them more drift prone. ULV formulations, which rely on light oil as a carrier, are less prone to evaporation.
- High relative humidity is preferable to minimize drift that can occur through evaporation. Applications at temperatures above 30°C and at relative humidity below 45% increase the risk of drift.
- Ensure that spraying is done in cross-wind conditions rather than directly into or with the breeze.
- Application should be avoided in calm, stable conditions which may occur early in the morning, late in the afternoon or during a temperature inversion.

- Technologically superior spraying equipment, such as a rain drop nozzle, may allow spraying to occur in a wider range of weather conditions without creating a drift hazard.
- Rain: Rain may cause run-off of the pesticide with a risk of environmental contamination. This should be taken into account when assessing risk to the environment. Pesticides must not be applied if rain is likely to wash the pesticides from the site of application.
- Inversion: Do not spray under conditions of atmospheric temperature inversion, where air closer to the ground cools faster than the air above it, and forms a layer where air temperature increases with altitude instead of decreasing. Small spray droplets released into an inversion layer can remain suspended and drift long distances. Inversion conditions are most likely in the early morning and late afternoon in the absence of wind, and are often marked by fog, smog or smoke drifting at a constant height instead of rising.

Minimising chemical waste and disposal:

- Some pesticides are no longer registered and restrictions may exist for disposal of such. You must never dispose of pesticide wastes or rinsates down drains, sinks, toilets, gully traps or into bodies of water.
- Empty containers must be rinsed and disposed of, or re-cycled in the manner suggested on the label. If manually rinsed, they should be triple rinsed. Disposal of drums/containers becomes a lesser environmental issue if they are rinsed correctly.
- Triple rinsing: An effective manual rinsing procedure is:
 - On emptying the contents into the spray tank, drain the container for an extra 30 seconds after the flow has reduced to drops.
 - Fill the container with suitable solvent to about 20 to 25% of its capacity.
 - Replace the cap securely.
 - Shake, rotate, roll and/or invert the container to wash all of the inside with rinse.
 - Remove the cap and add rinsing aid from the container to the spray tank. Drain the contents for an extra 30 seconds after the flow has reduced to drops.
 - Repeat steps these steps two more times.
 - Check the container thread, cap and thread, and outside surfaces, and if contaminated, rinse with a hose or hand wash.
 - Let the container dry completely and replace the cap.
 - Various rinsing attachments and transfer systems which have flush and rinse cycles are available.
- Containers should be returned to the supplier when they are marked 'returnable', or the label specifies return to point of sale.
- Where rinsed containers are stored ensure that lids or bungs are removed to prevent re-use and that containers are secure. If not returned to the supplier it may be appropriate to puncture or crush the container to ensure that it cannot be used again
- Containers should not be burned. Explosions may occur and the smoke and fire products are a risk to health.

Re-entry periods:

- The re-entry period is the period in which a treated field must not be re-entered by unprotected persons after the application of a chemical on a crop. This should be considered as part of the risk assessment.
- Workers and others should be advised of the correct time-lapse. It is important to observe the re-entry period where contact between foliage and skin is unavoidable.
- Look to see if the re-entry period is on the label.
- Where no re-entry period is stated, a minimum of 24 hours should be observed or until the chemical has dried upon the crop, whichever is the latter (subject to the risk assessment), unless appropriate PPE is provided and worn as intended. Caution should be exercised entering wet crops where chemicals have previously been applied, irrespective of the time lapse between application and re-entry.

Preparing, mixing and handling chemicals

Great care should be taken when handling concentrates and powders, as this is the time of greatest risk.

Observe the following precautions:

- Wear appropriate protective clothing and equipment and have an adequate supply of filters for the respirator.
- Handling powders or concentrates and mixing should be done in a well-ventilated area. Stand up-wind while opening, pouring and mixing.
- Do not eat, drink or smoke while preparing and mixing pesticides.
- Avoid contact with the skin, eyes or mouth. If contamination occurs, wash the affected area immediately with copious amounts of water (if indicated by the label).
- Avoid leftover prepared spray by effective calculation of the amount to be used and accurate calibration of equipment.
- The measuring and mixing process is the best time to wash empty pesticide containers. All pesticide containers should be triple-rinsed. The water used to rinse the container should be added to the spray tank during mixing.
- Spills should be cleaned up immediately.
- Prepare pesticides in the application tank, or on a drip tray over an impervious surface, at least 15 meters from any waterway.
- If the chemical is flammable, decant and prepare away from any possible ignition sources or heat sources.
- Do not use your mouth to blow or suck pipes or nozzles to clear them.
- If you feel ill, or start developing symptoms, stop work and seek medical attention.
- Never mix potentially hazardous or other household wastes. Don't, for example, pour multiple chemicals into one container. Instead, leave them in their original container. The chemical reaction may be toxic. It could lead to an explosion, or it could release a poisonous gas.
- Do not use chemicals that are not provided in the original, correctly labelled container.
- Never transfer chemical into another container that is not designed for the purpose, or one that is not carrying the correct label.
- Take only sufficient containers of chemical for the day's application, from the store to the site of mixing/loading/application.
- Where practicable, never leave chemicals unattended or unsecured against unauthorised access.
- Return unused chemical product to the store, ensuring that the label and container is undamaged.



Preparation

Before handling, mixing or applying chemical:

- read, understand, and follow the product label and MSDS before handling, mixing and applying the chemical. If you cannot read it, get someone to read it to you.
- Do not apply chemicals that are not registered or permitted for the intended use.
- Do not exceed the rate or frequency of application as described on the label or Permit.
- Ensure that you are satisfied that your manager's instructions for the work have reasonably covered health and environmental safety risks.
- Check personal protective equipment before use and clean and check it after each day's operations.
- Check application equipment regularly for wear, damage and leaks and ensure it is in proper working order according to the equipment manufacturer's specifications.
- Calibrate spraying equipment regularly, with water only, to ensure that the correct application rate of chemical spray mixture is applied. However, be aware that the addition of the chemical to the water may change the calculated application rate.
- Monitor output during or after application to be sure that the correct rate is being applied.
- Clean and maintain spray equipment according to the equipment manufacturer's instructions and/or the chemical product label, (which may recommend special cleaning methods).

- Never work alone when applying chemicals in particularly hazardous situations. If this is not possible, ensure that you can quickly contact another person in the event of an emergency, using a mobile telephone or radio.
- The instructions covering the concentration of the mixture and the application must be followed. Decanting should be avoided because of the difficulty of maintaining identification of decanted contents in new containers, unless used immediately. A chemical must not be transferred from one container to another (decanted), unless both containers are properly labelled. A chemical should be decanted only into another container designed for the chemical. Some chemicals can react with the container, if the wrong type of container is used.
- Do not decant a chemical into a food or beverage container.
- If the diluted pesticide is in a tank and not used immediately, it should display a warning sign with at least the following words:
 - POISON (followed by the common name of the pesticide)
 - AVOID CONTACT
 - HAZARDOUS PESTICIDE
- Unused diluted pesticide should be disposed of or kept in a labelled container.
- Never leave diluted chemicals in application equipment for longer than is necessary to complete the job, having regard for the quantity, toxicity and stability of the chemical.
- Clean application equipment at a place designated for that purpose, and return it to store.
- Dispose of surplus concentrated and diluted chemical (including equipment washings) safely, and in accordance with the regulations.
- Observe label restrictions on re-entry to the sprayed crop or area. Erect warning signs if necessary. Where there is no re-entry period stated on the label, it is advisable to stay out of the treated area until the spray deposit has dried. You should, however, note that there are a few chemicals that may continue to release odour for some time after application. Advise visitors to the property of the presence of recently sprayed crops.

Transport

- Transport packaged chemicals (those which are dangerous goods) on public roads, only with the correct documentation in a prominent position in the cab, describing the dangerous goods which are on board.
- Stow the chemicals safely and securely on the vehicle.
- If required, comply with other regulations with regards to the transport of the dangerous goods such as the placarding of vehicles, personal protective equipment, and public liability insurance requirements.
- Do not transport chemicals in the cabin of the vehicle, or on any vehicle containing food, feedstuffs or fertilizer.



Applying chemicals

- Use all appropriate control measures to reduce the risk of exposure, including any that have been developed as part of a risk assessment.
- Implement work practices and engineering controls that minimize exposure.
- Depending on the extent of these controls, wear appropriate, personal, protective equipment as recommended on the label and the MSDS.
- Do not allow children or unauthorised persons in the vicinity of chemical applications.
- Never eat, drink or smoke when applying chemicals.
- Ensure that you have clean washing water and soap for personal use when applying chemicals, and use them immediately after skin exposure to chemicals and before eating, drinking or smoking.
- Keep a suitable First Aid kit close by.

- Ensure that you have ready access to an eye-wash facility or bottle at all times.
- Do not clear blocked nozzles by mouth.
- Remove, replace and clean contaminated, personal, protective equipment immediately.
- Do not wear contaminated clothing in a closed tractor cab.
- Minimize the production of spray drift off the target crop or area.

Environmental protection

- Do not store, load or mix chemicals adjacent to, or near, an environmentally sensitive areas such as water bodies, bush reserves and wildlife.
- Do not apply chemicals if there are reasonable grounds to suspect that environmental damage could result. This includes the use of herbicides over the root zones of sensitive trees.
- Dispose of waste chemicals and containers using appropriate facilities that are provided by your manager.
- Do not contaminate water bodies or ground water with waste chemicals or containers.
- Prevent chemical drift on to surface waters during application. Check labels for warnings about aquatic species before applying chemicals to paddocks near dams or other water bodies.
- Only use equipment that has check or non-return valves which prevent back-flow when filling spray tanks from surface waters and in suction lines for chemical irrigation systems which draw directly from surface waters.

Protecting birds, bees and mammals:

- Avoid applying chemical on to paddocks under flood irrigation, to prevent contamination of water bodies and/or drainage channels.
- When applying chemicals that are relatively toxic to bees, only apply them early in the morning or in the evening when bees are not foraging.
- Check that, when beehives are in the vicinity of crops to be sprayed, the apiarist has been notified, to allow the removal of hives before spraying.
- Avoid contamination of surface waters where bees may drink.
- Incorporate granule formulations completely beneath the soil, particularly at row ends and machine-filling sites, where spillage may occur.
- Clean up spills immediately.
- Minimize risks to birds, by ensuring that you:
 - do not bait near bird habitats, but if this is unavoidable, use bait stations which prevent access by birds;
 - distribute baits evenly, with no locally high concentrations;
 - do not bait over bare ground or in more open situations, such as near crop perimeters, where birds may see the baits;
 - only bait where pest pressure is high;
 - bait late in the evening when birds have finished feeding;
 - promptly collect and bury rodent carcasses where these occur in open situations.
 - minimize drift into remnant vegetation, wildlife corridors, nesting sites, or other bird habitats;
 - scare birds from feeding in crops which are to be sprayed;
 - spray late in the day when birds have finished feeding; and
 - use only chemicals that have low toxicity to birds when large concentrations of birds are nesting nearby.
- Minimize risks to mammals from exposure to chemicals, by ensuring that you:
 - Heed label warnings and withholding periods before applying chemicals to paddocks containing grazing livestock;
 - Do not allow pets into recently sprayed areas;
 - Only apply chemicals to livestock and pets when the chemicals are registered for such uses.; and
 - Do not allow non-target animals to gain access to areas baited for vermin control.

Steps to consider in the event of a spill:

- evacuate non-essential persons from the immediate area of the spillage;
- wear protective clothing and equipment;
- take immediate steps to control the flow of chemical from the spillage source;
- call for assistance and/or raise the alarm if necessary;
- move livestock from the area if necessary;
- avoid direct contact with the chemical or fumes;
- keep naked flames away from the area;
- limit the spill area by restricting its spread, e.g. with a liquid use an absorbent material, or earth if this is unavailable;
- powder or dust pesticides (but not fumigants) can be contained by slightly wetting the material with a fine water spray (unless incompatible) or covering with plastic sheeting to avoid the emission of dust;
- cover the whole spillage area with absorbing material and allow time for the chemical to be absorbed;
- sweep or scoop the mixture into an appropriately labelled container for reuse, or if contaminated place into one marked 'Waste for Disposal';
- dispose appropriately;
- clean the site using methods recommended by the supplier



Emergency treatment & first aid procedures

General instructions

- read and follow the instructions on the label
- if the sufferer is unconscious, do not induce vomiting and do not administer anything by mouth
- first aid is only the first step, and is not a substitute for full professional medical treatment
- following first aid, take the sufferer to a doctor or hospital and make sure you take along the chemical container or label, or MSDS.

Specific first aid instructions:

Check the following procedures for each route of entry:

- Spilled on the skin or clothing: remove the clothing immediately and thoroughly wash the skin with water or soap. Do not scrub the skin harshly and do not use ointments, powders or medication unless instructed to do so by a doctor.
- Inhaled: get the sufferer to fresh air and keep him/her lying down, warm and calm. If breathing stops, use mouth-to-mouth resuscitation.
- Splashed into the eye: hold the eyelid open and gently wash the eye with clean running water for 15 minutes. Cover the eye with a clean cloth and seek medical attention immediately.
- Swallowed: read the instruction on the label – it will direct whether or not vomiting should be induced. Examples where vomiting should not be induced are chemicals which are petroleum based ("Emulsifiable Concentrate") or corrosive (acid or alkali).

Standard Operating Procedure (Worksheet)

Below is a general outline for a Standard Operating Procedure structure that could assist in the drawing up of SOP's for your farming operations. Questions should be answered with as much detail as possible. If a question does not apply to your procedure, simply specify "N/A."

1. PURPOSE

Why do we need this procedure and what is to be accomplished?

2. SCOPE

To which areas will this procedure be applied?

3. REFERENCES

What documents are related to this procedure?

4. DEFINITIONS

Are there any words that require defining (acronyms, scientific terms, and technical language)?

5. RESPONSIBILITY

Who will be held accountable for this procedure, directly or shared?

6. PROCEDURES

How will the procedure be done? List in order of completion and assign a number to each task.

7. VERIFICATION PROCEDURES

How will the effectiveness of this procedure be verified?

8. RECORDS

What documents (records) will be produced as a result of this procedure?

USEFULL CONTACTS, WEBSITES & REFERENCE MATERIAL

- <http://www.nda.agric.za/>
 - Agricultural Production, Health & Food Safety Branch
 - Food Safety & Quality Assurance (legislation, standards, SOP's, audit lists and criteria, FBO registration information, reference material, etc.)
- http://www.codexalimentarius.net/web/standard_list.jsp
- <http://www.ppecb.com>
- <http://www.grainsa.co.za>
- <http://www.arc.agric.za> (Grain Crops Institute)
 - Books/Publications:
 - Groundnut Diseases and Pests/Grondboon siektes en -plae
 - Groundnuts Always Tops/Grondbone altyd 'n Wenner (covers Morphology, seed and seed quality, cultivars, crop rotation, soil and seedbed preparation, planting practices, earthing up groundnuts, nutrition, weed, diseases, insects, viruses and nematodes, water use, irrigation and harvest.)
 - Groundnut Calendar (see summary elsewhere in this document)



GAP AUDIT RECORDKEEPING & CONTROL TEMPLATES

GAP Audit Recordkeeping & Control Templates

The templates and record examples contained herein can be used by the primary producer to facilitate the implementation and auditing of a documented GAP system for groundnut cultivation.

Document and Reference Index & Physical Checklist

The official GAP Audit Checklist and Compliance Criteria refer to Record and Physical criteria that will be verified by the auditor. The "Document and Reference Index" refers to the various written reports, records, standards and procedures which should be kept up to date and readily accessible for auditing. It also list the minimum required reference and/or supporting documents that would be required to demonstrate knowledge or control with regards to certain aspects.

In addition, the "Physical Checklist" is an in-house management tool that will enable the farmer or farm manager to evaluate whether all control points that will be physically or visually verified by the auditor has been addressed and is in place.

In both these cases, the same subdivisions and number system as found on the Audit Checklist are used for ease of cross reference.

It is again however strongly suggested that 'in-house' audits are conducted by using the official GAP Checklist.

Farm Information (Record R01)

Contains basic information on the farm, responsible persons and registration.

Production Record (Record R02)

Contains most of the relevant and important seasonal information with regards to each individual cultivation unit or field.

Field Application Record (A – C) (Record R03)

Record of all applications made on the field, including fertilizer, chemicals, etc. Different templates provided from which most appropriate can be chosen.

Equipment Maintenance, Verification and Calibration Record (Record R04)

Record to verify that equipment are effective and reliable when used.

Vehicle, Equipment & Container Assessment, Maintenance & Cleaning (Record R05)

Verify that containers and vehicles are managed as to reduce risk of contamination.

Pre-Harvest & Segregation Checklist (Record R06)

In-house checklist to verify all preparation and quality risk are addressed prior to harvesting. This record is not required for the audit, but could proof useful as management tool and evidence of due diligence.

Delivery Declaration (Record R07)

Record for traceability between farm and delivery point ("Passport")

Worker Training Record (Record R08)

Chemical Inventory (Record R09)

Risk Assessment : Site (Record A01)

Risk Assessment : Organic Fertilizer (Record A02)

Risk Assessment : Irrigation Water (Record A03)

Risk Assessment: Chemical Storage & Handling (Record A04)

GROUNDNUT GAP AUDIT RECORD & INFORMATION TEMPLATES

INDEX



Description		GAP Audit Reference (Item)		Record Reference	Supporting Documents
GENERAL					
1.	Farm & Contact Information	Registration & Certification		R01 : Farm Information	FBO Registration Certificate (http://fbo.daff.gov.za/FBO/index.jsp)
2.	FBO Registration	Registration & Certification		R01 : Farm Information	
3.	Quality/Food Safety Standard Certification (If applicable)	Registration & Certification		R01 : Farm Information	
TRACEABILITY					
4.	Identification & Traceability of harvested product	1.1; 1.2	Major	R02 : Production Record	Seed invoice and label example
		1.1; 1.2	Major	R07: Delivery Declaration	
SITE HISTORY & MANAGEMENT					
5.	Risk assessment on New Fields	2.1	Minor	A01: Risk Assessment on New Fields	
6.	Identification of Production Sites (Fields)	2.2; 2.3	Minor	R01 : Farm Layout & Field/Site Identification	
7.	Record of rotating crops	2.4	Minor	R02 : Production Record	
8.	Population ratio (plant/row spacing)	2.5	Minor	R02 : Production Record	ARC or other related cultivar data
9.	Weed Control	2.5	Minor	R03 : Fertilizer & Chemical Application Record	Labels/Material Data Safety Sheets
PROPOGATION MATERIAL					
10.	Cultivar adaptability & GMO Status	3.1	Major	R02 : Production Record	ARC or other related cultivar data
FERTILIZER USE					
11.	Fertilizer Application	4.1.1	Minor	R03 : Fertilizer & Chemical Application Record	Labels/Material Data Safety Sheets
12.	Food Safety Risk of Organic Fertilizer	4.3.2	Minor	A02: Risk Assessment Organic Fertilizer	
IRRIGATION & WATER QUALITY (Not applicable to non-irrigated farms)					
13.	Untreated Sewage water	5.1.1	Major	A03: Risk Assessment Irrigation Water	Water analysis and/or Public/Municipal Reports
14.	Quality of Irrigation Water	5.2	Minor	A03: Risk Assessment Irrigation Water	Water analysis and/or Public/Municipal Reports
CROP PROTECTION					
15.	Agro Chemical - Registration and application	6.1.1	Major	R03 : Fertilizer & Chemical Application Record (A-C)	Choose best suited template. MSDS or Product Labels; MRL requirements; Working Procedure; Worker Training Record and/or Sub-contractor records, Residue Test results (Refer to buyer or selection facility testing results - current or previous season)
16.	Management of residue levels and MRL requirements	6.1.2	Critical	R03 : Fertilizer & Chemical Application Record (A-C)	
17.	Correct application of chemicals	6.1.3	Minor	R03 : Fertilizer & Chemical Application Record (A-C)	
18.	Application Records	6.2	Critical	R03 : Fertilizer & Chemical Application Record (A-C)	
19.	Equipment	6.3.1/6.4.3	Minor	R04: Equipment Maintenance, Verification & Calibration Record	Calibration Verification Certificates of scales (annually)
20.	Storage of chemical products	6.4.5	Minor	R09: Chemical Inventory	
21.	Storage & Disposal of obsolete chemical products	6.4.8	Minor	R09: Chemical Inventory	Proof of Disposal
HARVESTING					
22.	Maturity of Crop at harvest	7.1	Major	R02 : Production Record	
23.	Weather Conditions	7.2	Minor	R02 : Production Record or own Farm records	
24.	Limiting of Damage to Pods during harvesting	7.3	Minor	R04: Equipment Maintenance, Verification & Calibration Records & Staff Training	
25.	Segregation of high risk product	7.4	Major	R02 : Production Record & R07: Delivery Declaration	
26.	Safe moisture level prior to delivery	7.5	Critical	R02 : Production Record & R07: Delivery Declaration	
27.	Vehicle Maintenance & Cleaning	7.6	Major	R05 : Vehicle, Equipment & Container Assessment, Maintenance & Cleaning Record	
27.	Equipment and Container Maintenance & Cleaning	7.7	Major	R05 : Vehicle, Equipment & Container Assessment, Maintenance & Cleaning Record	
28.	Container Use and Management	7.8	Major	R05 : Vehicle & Container Assessment, Maintenance & Cleaning Record	
29.	Procedures & Instructions to prevent contamination	7.9	Major	Staff Training : Health, Hygiene & Food Safety	
GENERAL REFERENCE DOCUMENTATION					
	Optimum Population Ratio & Adaptability	2.5	Minor	ARC Production Manual and Cultivar information	
	Cultivar Adaptability/Suitability	3.1	Major	ARC Production Manual and Cultivar information	
	MRL and Residue Management	6.1.2	Critical	Current Chemical MRL List for Groundnuts (www.daff.gov.za under "Food Safety and Quality Assurance")	

GOOD AGRICULTURAL PRACTICE:
GROUNDNUTS

PHYSICAL CHECKLIST

This checklist refers to Control Points, that in addition to possible records, must be physically or visually verifiable and/or demonstrated.
Refer to Audit and Critical Checklist for detail.

Description	GAP Audit Reference (Item)	YES	NO	N/A
TRACEABILITY				
All products are traceable to physical field location and to recipient (as recorded on R02 & R03)	1.1 & 1.2	Major		
SITE HISTORY & MANAGEMENT				
A visual identification system, linked to the record system is implemented that can be physically/visually confirmed.	2.3	Minor		
FERTILIZER USE				
All Organic and Inorganic fertilizer are stored separately from any fresh produce.	4.2.1	Minor		
Inorganic fertilizer are stored appropriately: - Separate from crop protection products by means of physical barrier (wall or appropriate sheeting) - Storage area is covered to protect from sunlight, frost and rain and not directly on soil. - Area is free from waste. - Spillage & Leakage cleared away.	4.22	Minor		
Use of human sewage banned on all crops.	4.3.1	Critical		
Intentional use of untreated sewage water prohibited.	5.1.1	Major		
CROP PROTECTION				
Workers (and sub contractors) are trained/qualified and can demonstrate correct calculation, preparation, application of chemicals as per written procedure and instruction.	6.1	Minor to Critical		
Verification of application equipment can be demonstrated.	6.3.1	Minor		
PESTICIDE STORAGE & EMPTY CONTAINERS (Not applicable if proof of sub-contracted service can be supplied)				
Storage area is securely locked and well lit.	6.4.1	Minor		
Only pesticides & equipment in storage area.	6.4.2	Minor		
Appropriate equipment available for measuring and mixing.	6.4.3	Minor		
Access is limited to authorized personnel only.	6.4.4	Minor		
Updated inventory register with 3 months history is available.	6.4.5	Minor		
Pesticides stored in original container/packaging.	6.4.6	Minor		
Pesticides store are clearly identified by permanent signage at/on access door.	6.4.7	Minor		
Obsolete chemicals are stored securely and separately and disposed by authorized authorities.	6.4.8	Minor		
Empty pesticide containers are not reused, but pierced and stored securely and disposed of as per local legislation.	6.5.1	Minor		
HARVESTING				
Farmer/Farm Manager can demonstrate/ explain process of determining maturity of crop.	7.1	Major		
Is harvesting and picking done in such a way that damage to pods are limited as far as possible (by means of proper equipment maintenance and worker training).	7.3	Minor		
Farmer/Farm Manager can demonstrate/ explain process of segregation of high risk product.	7.4	Major		
Farmer/Farm Manager can demonstrate/ explain process of drying to ensure and confirm safe moisture level as determined by recipient requirements.	7.5	Critical		

GOOD AGRICULTURAL PRACTICE: GROUNDNUTS

PHYSICAL CHECKLIST

<u>Description</u>	<u>GAP Audit Reference (Item)</u>		<u>YES</u>	<u>NO</u>	<u>N/A</u>
Verhicles, equipment & containers are cleaned and maintained as to prevent contamination, including foreign material, other commodities, chemical, dirt etc).	7.6 & 7.7	Major			
Containese are use exclusively for groundnuts and multiple use containers are properly cleaned before use.	7.8	Major			
Staff can demonstrate effective maintenance, management and adherence to procedures and instructions to avoid contamination of any kind.	7.9	Major			

Consider completing:

Record A04: Chemical Storage & Handling Risk Assesment

Checklist completed on:

By:

[illegible]

Registered Farm Name:		FBO Nr:	
Address:		Tel Number:	
		Cell Number:	
		E-mail Address:	
		GPS Co-ordinates:	
Name of Registered Owner:		Tel/Cell Number:	
Name of Farm Manager:		Tel/Cell Number:	
Quality/Food Safety Certification (e.g. HACCP, Globalgap, BRC etc.):		Date of last GAP Audit:	

FARM LAYOUT AND FIELD/SITE IDENTIFICATION (Not on Scale)



Total HA:	
Legend	
Planting Areas:	
S1	Site A
S2	Site B
S3	Site C
S4	Site D
Ha:	
C1	Chemical storage
C2	Chemical mixing area
C3	Chemical equipment c
F1	Fertilizer storage
W1	Water Reservoir
W2	Drainage
W3	Wastewater discharge
Main Buildings:	
B1	House
B2	Offices
B3	Stores/Sheds/Barn
	Roads

GOOD AGRICULTURAL PRACTICE:
GROUNDNUTS

PRODUCTION RECORD
(To be completed for each individual field/site)

Record: R02

Farm: _____ Commodity: _____
FBO Code: _____ Variety: _____
Field/Site Reference: _____ Crop year: _____

Field/Site Evaluation & History

This is a new production site, planted for the first time after animal or non-food cultivation use.

If a new site, a risk assessment has been done to evaluate possible risk to current groundnut production.

Crop Rotation: _____ Watering system: _____
(List three prior crops cultivated on this field
beginning with most recent) _____

	Yes:	No:
N/A:	Yes:	No:
Natural Rainfall		
Irrigation		

Planting

Plant Date/s: _____ to _____ Hectares Planted: _____
Till or No Till: _____ Kg seed/hectare: _____
Row Spacing: _____ Seed/Plant Spacing: _____
Cultivar suitable/adapted for region: Yes: No: _____ GMO Variety: Yes: No: _____

Harvesting

Harvest Date/s: _____ to _____ Hectares Harvested: _____
Total Growing Period (days): _____ Average yield (pods/ha): _____
Optimum maturity reached: Yes: No: _____
Reason/s for harvesting if optimum maturity not reached: _____
Drought influence on crop: Yes: No: _____
Method of Harvesting: Mechanical: Manual: Sub Contracted: Yes: No: _____

Drying

Method of on-field drying: _____
(Tick applicable)

Heaps	Period:	days
Windrow	Period:	days
No:	Light:	Heavy:

Rain during field drying: _____

Was safe moisture reached as per recipient requirements? Yes: No: _____ (Refer to delivery declaration)

GOOD AGRICULTURAL PRACTICE:
GROUNDNUTS

PRODUCTION RECORD
(To be completed for each indivudial field/site)

Record: R02

Weather Conditions during production (Or Alternatively Farmer's own record)																
	October				November				December				January			
	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4
Total Rainfall (mm)																
Average Temp (High)																
Average Temp (Low)																

	February				March				April				May			
	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4
Total Rainfall (mm)																
Average Temp (High)																
Average Temp (Low)																

Delivery		
Delivered to:		Delivery Ref Nr: (Refer R03)
Delivered to:		Delivery Ref Nr: (Refer R03)
Delivered to:		Delivery Ref Nr: (Refer R03)

Farm: _____

FBO Code: _____

Field/Site Reference: _____

Plant Date: _____

Commodity: _____

Variety: _____

Crop year: _____

Harvest Date: _____

List all soil treatments, preplant soil and seed treatments, post plant soil and foliar treatments. Include all fumigants, herbicides, insecticides, fungicides, growth regulators etc.

*Stage: Pre Planting (1); Planting (2); Pre Emergence (3); Post Emergence (4) Pre Blooming (5); Pod Development to filling (6); Pre Harvest (7)

****Type of application:** Organic Fertilizer (1); Inorganic Fertilizer (2); Seed Treatment (3); Herbicide (4); Fungicide (5); Nematicide (6); Insecticide (7); Other (8)

[illegible]

Application date (completed)	* Crop Stage	** Type of Application	Application Equipment	Target or Reason for application	Product (Name and Active Ingredient where applicable)	Rate	Withholding period if applicable (Days)	Name of Person in Charge of Application:

Farm:		Commodity:	
FBO Code:		Variety:	
Field/Site Reference:		Crop year:	

EVALUATION			
Date of Application:		Technical Person Responsible:	
Growth stage:		Operator Name:	
Size of Area:			

Sensitive Area detail:	- Risk to adjacent crops, resources or operations?	Yes		No	
	- Should adjacent farm/neighbours be informed of intention to spray?	Yes		No	

Reason for application:	Insects	Disease	Nematode	Other

Detail of target or reason for application:	
---	--

Weight of problem:	Heavy		Medium		Light		Preventative	
Growing Conditions:	Very Good		Good		Poor		Very Poor	
Plant Conditions:	Very Good		Good		Poor		Very Poor	
Soil Conditions:	At dept wet		Moist		Dry surface		Dry	

PREPARATION					
Operator read and understood labels, MSDS and instructions?		Yes		No	
Risk Assessment done (if required)?	N/A	Yes		No	
Controls in place?		Yes		No	
Measuring, mixing and application equipment in good working order, clean and calibrated?		Yes		No	

APPLICATION DETAIL		
Products Used (Full Product Name)	Rate	Amount/volume of chemicals used
Additives used	Rate	Amount/volume additives used

Water supply for mixing chemicals:	Nozzle Type		Water rate used:	
	Nozzle number/size		Weather during application:	
	Spray quality		Wind direction:	
	Nozzle spacing		Wind speed:	
	Spray pressure		Temperature:	
	Speed		Time application started:	
	High above target		Time application ended:	
	Single/Twin lines			

Any chemicals left in the tank?		Yes		No	
Was this disposed of as per procedure and legislative requirements?	N/A	Yes		No	

WITHHOLDING; PRE HARVEST INTERVAL & MRL RISK				
Pre Harvest Interval:		Withholding period:		
Has the MRL requirements set by local and import country regulations been considered and effectively managed in:	Choice of chemical	Yes		No
	Application of chemical	Yes		No
	Withholding period	Yes		No
	Pre Harvest Interval	Yes		No

Signed by Person responsible for preparation:	
Signed by Application Operator:	
Signed by Manager/Supervisor:	

Commodity: _____

Variety: _____

Crop year: _____

Harvest Date:

IN-ORGANIC FERTILIZER APPLICATION

[illegible]

ORGANIC FERTILIZER/SOIL AMENDMENT/MULCH APPLICATION

[illegible]

GOOD AGRICULTURAL PRACTICE:
GROUNDNUTS

EQUIPMENT MAINTENANCE, VERIFICATION AND
CALIBRATION RECORD

Record: R04

<u>Date</u>	<u>Equipment</u>	<u>Maintenance</u>	<u>Repair</u>	<u>Cleaning and Sanitation</u>	<u>Verification</u>	<u>Calibration</u>	<u>Action Performed/Reason for Action</u>	<u>Intials</u>

Note: Calibration documents/proof/certificates should be proviced as evidence of calibration of equipment, including method.

GOOD AGRICULTURAL PRACTICE:
GROUNDNUTS

**VEHICLE, EQUIPMENT and CONTAINER ASSESSMENT, MAINTENANCE
and CLEANING**

Record: R05

Date	Detail of Vehicle, Equipment or Container Inspected	Vehicle ID or Reg Nr	Record Concern by Ref Nr (see notes)	Record Corrective Measures Taken	Person Responsible

Inspect vehicles for the following items and record concerns by reference number:

- | | |
|------------------------------------|--|
| 1. Signs of pest or insects | 4. Foreign materials: manure, garbage, glass, oil, chemicals, plant or animal debris, etc. |
| 2. Damage (e.g., splinters, holes) | 5. Maintenance required (e.g., hinges, locks or load-securing devices) |
| 3. Odors (e.g., chemicals, oil) | 6. Containers/transport units are not used exclusively for produce. |

Corrective Actions: If any hazards were identified above, corrective measures (or a combination thereof) must be taken and recorded:

- | | | |
|---|--|----------|
| A. Refusal to load product onto vehicle/into unit | B. Sweep | C. Rinse |
| D. Maintenance (e.g. repair hinges, locks, load securing devices) | E. Wash/clean wit approved cleaning agents | F. Other |

Farm:

Commodity:

FBO Code:

Variety:

Field/Site Reference:

Crop year:

Plant Date:

Harvest Date:

Question	Yes	No	Action Taken	Initials
Are ablution facilities readily available to workers, either by location or scheduled transport arrangements?				
Is potable water available to workers?				
Is harvesting equipment available and in good and clean condition?				
Is there evidence of physical contamination or adverse conditions in the crop area that must be addressed or managed?				
Are possible fuel and chemical contaminants isolated from the crop/harvesting area?				
If applicable, are contaminated or high quality risk areas isolated for "no harvest" or segregation?				
Is transport equipment and containers available, clean and free from any non-groundnut matter/commodities.				
Other Notes or Comments:				

*To be completed in duplicate for each individual load.**A copy to accompany to the load/s and be retained by the recipient. A second copy, signed by recipient to be retained by producer.*

Delivered from: (Name & District)				Delivery Ref Nr:			
				Producer FBO Code:			
				Transport: (Tick which applicable)		Own	
						Contracted	
				Recipient			
Cultivar:			Crop Year:			Name of Contractor: (if applicable)	
Harvest Date/s:			Field Ref:				
Date Delivered:		Truck Registration:		Trailer Registration:		Tick applicable:	
						Kernels:	Pods:
						Bagged:	Loose:

Declarations by Producer:

Inspection of Vehicle: We have, prior to loading, visually inspected the vehicle recorded above and believe it to be in a fit condition to carry groundnuts destined to enter the food chain. No tests have been carried out to establish this and no warranty is given by this declaration.

Post Harvest Treatment: (Tick applicable)

a. No Post-Harvest treatment has been applied to the crop carried by the vehicles referred to herein.

b. Post-Harvest applications of pesticide and/or other treatment, at or below recommended level as stated by the manufacturer, have been made to the crop carried by the vehicles referred to herein. Application records available on request.

Aflatoxin: Although all possible steps have been implemented to reduce risk of Aflatoxin development and contamination, no mycotoxin test were done on Primary Production level.

GM Statement: The product carried by the vehicle listed herein are not Genetically Modified.

Cultivation: The product carried by the vehicle have been produced under the application of GAP principles, with specific reference to aflatoxin prevention and control.

Segregation of high risk product: (Tick Applicable)

	a. No reason for segregation existed during harvesting
	b. Segregated higher risk stock not delivered in this load
	c. No segregation despite higher risk circumstances.

Detail: (See copy of segregation report)

Signed on behalf of producer:

Name

Signature

Date

RECEIVER DETAIL & CONFIRMATION

Delivered to: (Name & District)				Recipient FBO Code:			
				Receipt Ref Nr:			
Intake Information (To be completed by Recipient):							
Mass (mt) Received:	Weigh-bridge Ticket:	Sample Moisture:	Sample Aflatoxin:				

Signed on behalf of receiver:

Name

Signature

Date

[illegible]

**GOOD AGRICULTURAL PRACTICE:
GROUNDNUTS**

CHEMICAL INVENTORY
(Completed for each individual product)

Record: R09

Act 36 of 1947 Registration Number	Type (Tick applicable)			Group	Product Name	Active Ingredients & Concentration		
	Insecticide	Herbicide	Fungicide					
Intake and Use Record								
INTAKE				Initial	USE/DISPOSAL			Initial
Date	Description/Invoice	Quantity	Date		Reason	Quantity		
Note: Indicate obsolete stock disposed of as outgoing and keep proof of official disposal on file.					Checked by Technical Responsible Person:		Date:	
							Signature:	

GOOD AGRICULTURAL PRACTICE: RISK ASSESMENT ON NEW FIELD
GROUNDNUTS **(or where Risk Status have changed)**

Record: A01

The Food Safety Risk Assesment herein, takes into account site history and considers possible risks that is critical to food safety and will be reviewd annually.

Risk Assessment will be conducted on sites planted for the first time after animal or non-food production or where new risk has been identified on previously cultivated soil.

Field/Site Reference: _____

Date of Assessment: _____

Assessment done by: _____

1. Local or other legislation/regulation has been verified and does not prohibit the agricultural devolpment and cultivation of field crops on this site.

Yes	No

2. Previous use of site:

- Previous non-food crops:

- Previous use (other than non-food crops, e.g.. mining, animal farming etc.):

3. Soil:

- The soil is structural suitable for intended cultivation.
- Chemical contamination of ground.
- Heavy metal contamination of ground.
- Signs or riks of polution of soil.
- Nearby or adjacent production or activities that pose a risk.
- Soil type ideal for groundnut production.
- Addequite drainage.

Yes	No

Signed: _____

Date: _____

The Food Safety Risk Assessment herein, takes into account possible food safety risks referring to the use of organic fertilizer (if applicable and excluding human waste which is prohibited).

Field/Site Reference: _____

Date of Assessment: _____

Assessment done by: _____

Description of organic fertilizer:			
Supplier:			
Typical application period:	Before planting		
	Post emergence		
	Typical withholding period:		
Method/detail of composting: (Documented evidence must be available to indicate what composting method was used with indication that it will be safe for use on groundnut fields.)			
IF not addressed above, risks of:	Yes	No	Reason/Mitigation of Risk:
- Biological contaminatoin			
- Heavy Metal contamination			
- Disease Transmission			

Use of the fertilizer as described herein is approved for use on groundnuts as all possible risk has been considered and mitigated where needed.

Signed: _____

Date: _____

The Food Safety Risk Assessment herein, takes into account possible food safety risks referring to the unintentional use of untreated or polluted irrigation water (if applicable).

Field/Site Reference: _____

Date of Assessment: _____

Next Assessment Date: _____

Assessment done by: _____

Irrigation Method:			
Source of Irrigation Water:			
	YES	NO	UNVERIFIED
Intentional use of untreated or polluted irrigation water is prohibited.			
Irrigation water complies with WHO Guidelines for Safe Use of Wastewater and Excreta in Agricultural and Aquaculture 1989 (1000faecal coliforms/100ml).			
Possible pollution source present in water supply:			

Detail of water analysis or quality records attached
(Analysis not required annually unless new risk are evident or suspected)

Description of Analysis or Report:	Issued by:	Date issued/published:
Corrective or mitigating actions in case of confirmed risk:		

Use of the irrigation water as described herein is approved for use on groundnuts as all possible risk has been considered and mitigated where needed.

Signed: _____

Date: _____

TRAINING

Training has been provided to all workers/employees required to have contact with, mix and/or apply chemicals:	Yes	No

Type of Training: (Refer to Training records)	
---	--

Detail of any accreditation/ certification:	
---	--

STORAGE

What kind of chemicals are being held and average, maximum amount to be stored at any one time:

[illegible]

How is the chemical store made secure from access by unauthorised persons?

1. Locks	Yes:	No:
2. Child-proof gates (if child access is a risk)	Yes:	No:
3. Other:		

How are chemicals protected from moisture?

1. On pallets	Yes:	No:
2. On shelving	Yes:	No:
3. Other:		

How are spills controlled in the storage area?

1. Impervious and structurally sound bunds with adequate capacity?	Yes:	No:
2. Concrete sill and walls with adequate capacity?	Yes:	No:
3. Trays on shelves?	Yes:	No:
4. Metal cabinet with built in bund	Yes:	No:
5. Other:		

If spills occur, what equipment is available to clean them up?

Lime		Sand		Absorbent	
Broom		Shovel		Drum	

Other: _____

Is the storage area resistant to fire?	Yes:	No:
What fire equipment is available?		

Water hose		Water bucket	
Dry powder extinguisher		Other Extinguisher	

Other: _____

Have workers/employees received training in emergency procedures?	Yes:	No:
--	------	-----

MIXING AND PREPARATION

Is spillage containment at the mixing site sufficient to contain the contents of the largest container used?	Yes:	No:
---	------	-----

What personal protective equipment is available when mixing:

Apron		Gloves		Face mask		Goggles	
Respirator		Overalls		Other:			

Is there adequate ventilation while mixing?	Yes:	No:
--	------	-----

Is mixing done with more than one person present or within calling distance?	Yes:	No:
---	------	-----

Is water available to the workers for emergency washing?	Yes:	No:
---	------	-----

DISPOSAL

Is procedures and training in place to dispose of chemical containers?	Yes:	No:
---	------	-----

Is procedures and training in place to dispose of excess chemicals?	Yes:	No:
--	------	-----

Date: _____

Name: _____

Signed: _____



ADDENDUMS

- A. Groundnut Primary Production Checklist**
(Implemented 1 October 2013)
- B. Compliance Criteria, Notes & Management Aids (GAP Audit)**
(Implemented 1 October 2013)
- C. CAC/RCP 55-2004 : Code of Practice for the Prevention and Reduction of Aflatoxin Contamination in Peanuts**
- D. CAC/RCP 22-1979 : Codex Alimentarius Recommended International Code of Hygienic Practice for Groundnuts**
- E. MRL for use on Peanuts – South Africa, EU & Japan (Published July 2012)**
(Updated on www.daff.gov.za in “Divisions: Food Safety and Quality Assurance” Section)
- F. Producer Stock Grading Guideline**



A

Grondboon Primêre Produksie Nagaanlys
(GAP Oudit)
(1 October 2013)

Groundnut Primary Production Checklist
(GAP Audit)
(1 October 2013)

Standards Regarding Food Safety and Food Hygiene of Regulated Agricultural Food Products of Plant Origin destined for Export.

-as stipulated under 4(3)(a)(ii) of the Agricultural Products Standards Act 119 of 1990, and promulgated in notice R707 of 13 May 2005.

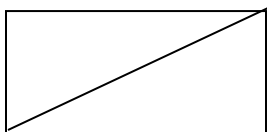
FBO Type: Primary Production

Revision 4: July 2013

Implementation date: 01 October 2013

CHECKLIST

Scope: Production, Harvesting and Traceability of Groundnuts destined for export.



'Not applicable' is **not** justified

CHECKLIST - Primary Production (AUDITED)					
R/P	Item	Control Point	Level	Compliance Y / N / Na	Comments/Notes

1.		ON-FARM TRACEABILITY			
R/P	1.1	Is harvested product identified and traceable to where it was produced?	MAJOR		
R/P	1.2	Is the next receiver in the supply chain identified?	MAJOR		
2.		SITE HISTORY AND MANAGEMENT			
R	2.1	Has a risk assessment been conducted for <u>new production sites</u> or existing sites (where the risk status have changed) showing them to be suitable for production?	MINOR		
R	2.2	Has a recording system been established to identify each production site?	MAJOR		
R/P	2.3	Has a visual identification system, linked to the recording system for individual production sites been implemented?	MINOR		
R	2.4	Does the cultivation record indicate that crop rotation principles are being applied?	MINOR		
R	2.5	Has the risk of drought stress been mitigated by: - Optimum population ratio considering cultivar characteristics - Effective weed control	MINOR		

CHECKLIST - Primary Production (AUDITED)					
R/P	Item	Control Point	Level	Compliance Y / N / Na	Comments/Notes

3.		PROPAGATION MATERIAL: (NO-GMO VARIETIES ARE USED)			
R	3.1	Has the choice in cultivar been made with consideration of the adaptability in the planting region and to exclude any Genetically Modified seed?	MAJOR		
4.		FERTILIZER USE			
4.1		Fertiliser Application Records (Inorganic & Organic)			
R	4.1.1	Have all dates, production sites, fertilizer types, quantities, method for application and operator been recorded?	MINOR		
4.2		Fertiliser storage (Inorganic & Organic)			
P	4.2.1	Are fertilizers stored separately from produce.	MINOR		
P	4.2.2	Are inorganic fertilizers stored appropriately and separate from crop protection products.	MINOR		
4.3		Organic fertilizer			
P	4.3.1	Has the use of human sewage been banned on crops?	CRITICAL		
R	4.3.2	Has a food safety risk assessment of the organic fertilizer been considered, before application?	MINOR		
P	4.3.3	Is organic fertilizer incorporated into the soil prior to planting and not applied during the growing season?	MINOR		
5.		IRRIGATION			

CHECKLIST - Primary Production (AUDITED)					
R/P	Item	Control Point	Level	Compliance Y / N / Na	Comments/Notes

5.1		Untreated Sewage Water					
P	5.1.1	Is the intentional use of untreated sewage water prohibited on the farm?	MAJOR				
5.2		Quality of Irrigation water (Only N/A in natural rainfall areas with no irrigation)					
R	5.2.1	Has a risk analysis been performed on the quality of irrigation water, specifically taking into account the microbial content?	MINOR				
R	5.2.2	If the risk assessment so requires, have adverse results been acted upon before the next harvest cycle?	MINOR				
6.		CROP PROTECTION					
6.1		Choice and use of chemicals					
R/P	6.1.1	Are chemical products registered for use on groundnuts, used according to the product label and are workers who handle and apply crop protection products trained and working according to a working procedure?	MAJOR				
R/P	6.1.2	Are chemical products used, taking into account local and export (potential country of destination) MRL requirements?	CRITICAL				
R	6.1.3	Is a spray instruction available indicating how the correct application rate has been calculated and how the chemical product must be prepared according to the label instructions?	MINOR				

CHECKLIST - Primary Production (AUDITED)					
R/P	Item	Control Point	Level	Compliance Y / N / Na	Comments/Notes

6.2		Pesticide spray records					
R	6.2.1	Do the application records reflect the following information: • Date of application • Commodity & variety • Identification of production site • Trade name and active ingredients applied • Product quantity/concentration • Name of operator responsible for application & technically responsible person • Application machinery/equipment	CRITICAL				
R	6.2.2	Have the pre-harvest intervals (withholding periods) been observed for all pesticide spray applications?	CRITICAL				
6.3		Application equipment					
R/P	6.3.1	Is the application equipment verified before different applications at least on an annual basis?	MINOR				
6.4		Storage of Pesticides (These control points can only be marked as n/a when evidence of sub-contracting of spraying function can be provided to the auditor.)					
P	6.4.1	Is the pesticide store locked, secure and well lit?	MINOR				

CHECKLIST - Primary Production (AUDITED)							
R/P	Item	Control Point	Level	Compliance Y / N / Na			Comments/Notes
P	6.4.2	Are only pesticides, measuring and spraying equipment stored in the pesticide store?	MINOR				
P	6.4.3	Is appropriate equipment available for measuring and mixing of pesticides?	MINOR	/			
P	6.4.4	Is access to the pesticide store limited to authorized personnel?	MINOR				
R/P	6.4.5	Is an inventory (register) with at least 3 months worth of history available for all pesticides in the pesticide store?	MINOR				
P	6.4.6	Are all pesticides stored in their original container/packaging?	MINOR				
P	6.4.7	Is the pesticide store properly identified?	MINOR				
R/P	6.4.8	Are obsolete chemical products stored securely and disposed of by the appropriate authorities?	MINOR				
6.5		Empty Pesticide Containers					
P	6.5.1	Are empty pesticide containers not reused, pierced, stored securely and disposed of in accordance with national legislation?	MINOR	/			
7.		HARVESTING: (This Section can only be marked as n/a if a contract from the company performing the harvesting function includes control point 7.1 - 7.10)					
R/P	7.1	Is harvesting of the crop done within recommended maturity period after planting period?	MAJOR				

CHECKLIST - Primary Production (AUDITED)							
R/P	Item	Control Point	Level	Compliance Y / N / Na			Comments/Notes

R	7.2	Are there records of the weather conditions (temperature, humidity and rainfall) during the harvesting period?	MINOR				
R/P	7.3	Is harvesting done in such a way that damage to pods is avoided?	MINOR				
R	7.4	Is there evidence to show that attempts are made during harvesting to segregate high risk stock (for example plants/pods from areas of the field that might have been waterlogged or exposed to other adverse effects)?	MAJOR				
P	7.5	Whilst considering moisture level agreed with buyer, does evidence or records suggest that chosen drying method was effective in achieving optimum and safe moisture prior to delivery/storage?	CRITICAL				
R	7.6	Are vehicles used for transport of harvested produce cleaned and maintained where necessary according to risk assessment?	MAJOR				
R/P	7.7	Are container and tools used for harvesting cleaned, maintained and protected from contamination?	MAJOR				
R/P	7.8	Are produce containers used exclusively for produce?	MAJOR				
R/P	7.9	Are documented instructions for handling produce to avoid contamination of the product implemented?	MAJOR				

CHECKLIST - Primary Production (AUDITED)					
R/P	Item	Control Point	Level	Compliance Y / N / Na	Comments/Notes

8.	Integrated Pest Management			
<i>Integrated Pest Management (IPM) involves the careful consideration of all available pest control techniques and the subsequent integration of appropriate measures that discourage the development of pest populations, and keeps plant protection products and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. Given the natural variation on pest development for the different crops and areas, any IPM system must be implemented in the context of local physical (climatic, topographical etc), biological (pest complex, natural enemy complex, etc.) and economical conditions.</i>				
Reference GlobalG.A.P Guideline: Annex CB.3 Guideline IPM toolkit				
8.1 to 8.3 Can the producer show evidence of implementation of at least one activity that falls in the category of:				
P/R	8.1	Prevention	Audited/ Not scored	
P/R	8.2	Observation and Monitoring	Audited/ Not scored	
P/R	8.3	Intervention	Audited/ Not scored	
9		Food Biosecurity		
	9.1	Is there a risk assessment for intentional food contamination and are procedures in place to address identified risks?	Audited/ Not scored	

CHECKLIST - Primary Production (AUDITED)					
R/P	Item	Control Point	Level	Compliance Y / N / Na	Comments/Notes

AUDIT SUMMARY

Summary

	Control points/ Checklist	Number N/A justified	Results of this Audit	
			No of control points applicable	No of control points N/A
TOTAL NO OF CRITICAL CONTROL POINTS	6	1		
TOTAL NO OF MAJOR CONTROL POINTS	11	5		
TOTAL NO OF MINOR CONTROL POINTS	24	16		
TOTAL CONTROL POINTS	41			

General Comments.....

.....

.....

.....

.....

Auditor Signature..... FBO Representative Signature..... FBO Code.....

Name.....(.....) Name.....

Date...../...../.....

Date...../...../.....



B

**Voldoeningskriteria, Aantekeninge en
Bestuurshulpmiddelen
(GAP Oudit)
(1 October 2013)**

**Compliance Criteria, Notes & Management Aids
(GAP Audit)
(1 October 2013)**

Standards Regarding Food Safety and Food Hygiene of Regulated Agricultural Food Products of Plant Origin destined for Export.

-as stipulated under 4(3)(a)(ii) of the Agricultural Products Standards Act 119 of 1990, and promulgated in notice R707 of 13 May 2005.

FBO Type: Primary Production and On-farm Produce Handling.

Revision 4: July 2013

Implementation date: 01 October 2013

COMPLIANCE CRITERIA, NOTES AND MANAGEMENT AIDS.

Scope: Production, Harvesting, and Traceability of Groundnuts destined for export.

NOTES AND MANAGEMENT AIDS

1.	REGISTRATION <i>PPECB would confirm the registration status of a Food Business Operator and establishment(s) before arranging an audit.</i>	
#1.1	Have relevant establishments been registered with the Department of Agriculture, Forestry and Fisheries with regard to FBO?	The Food Hygiene and Food Safety Standard issued under the APS Act [Agricultural Product Standards Act, 1990 (Act No. 119 of 1990)] specifies that a Food Business Operator (FBO) must register establishments that handle products of plant origin that are destined for export. All product handled or processed must be registered with the Department of Agriculture. Each registered establishment is allocated a FBO Code. For on-farm facilities the packhouse and cold store would be assumed to be a single establishment. The FBO is responsible for keeping registrations and details associated with the FBO Code up to date. Please register at: http://fbo.daff.gov.za/FBO/index.jsp Details relating to FBO registrations are available on the Department of Agriculture website, www.daff.gov.za in "Divisions: Food Safety and Quality Assurance" section.
#2	CERTIFICATION <i>PPECB would confirm the certification status of a Food Business Operator and establishment(s) before arranging an audit.</i>	
#2.1	Has a FBO (establishment) been certified as complying with a standard such as Globalgap, Nature's Choice, HACCP or BRC etc.?	PPECB establishes the priority and frequency of audits based on the risk profile of a FBO (establishment). A FBO (establishment) that is certified as complying with a recognized standard would usually be considered to be a relatively lower risk than a FBO (establishment) that has no certification. (See the low risk profile on the DAFF website)

NOTES AND MANAGEMENT AIDS

#3.	RECORD KEEPING FOR FOOD SAFETY PURPOSES
	Records provide evidence of diligent operations and compliance with requirements and, in the event of something going wrong, may be vital to investigations and consequential actions such as product withdrawals. The FBO (establishment) is responsible for implementing a suitable record keeping system. <u>As illustrations of statement of requirements:</u> - The Food Hygiene and Food Safety Standard issued under the APS Act [Agricultural Product Standards Act, 1990 (Act No. 119 of 1990)] requires a primary production food business operator to: • Establish a record system for each field, orchard or greenhouse to provide a permanent record of activities undertaken at those locations; • Establish a visual identification or reference system for each field, orchard or greenhouse; • Keep records or documentation containing the following relevant information for at least 2 years: ▪ Suppliers of agricultural inputs and lot numbers of agricultural inputs; ▪ Irrigation practices; ▪ The correct and applicable use of plant protection products and fertilizers; ▪ The proper treatment of manure or biosolids or organic fertilizers; ▪ Cleaning and waste disposal programmes; and ▪ The results of analyses carried out on samples taken of products or of other analysis made with regard to: • Plant protection products; • Water quality; • Soil contamination. - Quality Standards and Food Hygiene and Food Safety Standards issued under the APS Act [Agricultural Product Standards Act, 1990 (Act No. 119 of 1990)] specify that, for traceability purposes, food business operators should keep adequate records which allow them to identify the suppliers of ingredients and food products used in their operations, as well as food businesses supplied with products. <u>Requirements relating to records are specified in the food safety checklist questions and compliance criteria, and highlighted by an “R”.</u> <u>Requirements relating to physical evidence are specified in the food safety checklist questions and compliance criteria, and highlighted by “P”.</u> - Records may not always be available at the point of operations during the audit e.g. were record sheets to be processed in the administration or information services department. Nevertheless, operational management and staff should know where all relevant records would be held, and the auditor should have access to the records requested during an audit. - Historic records would usually not be examined during a food safety audit. It would be good practice for the FBO (establishment) and operational management and staff to review the findings of a food safety audit with regard to the quality and availability of records in each aspect of operation assessed, by answering under each section of this checklist, whether the records requested during the audit were available, and where there are any specific considerations to be noted or actions required.

NOTES AND MANAGEMENT AIDS

Records summary/review worksheet – Primary production and on-farm produce handling *(This document is not audited.)*

Section 1	TRACEABILITY - Are records requested during the audit available? - Are any specific considerations to be noted or actions required?	
Section 2	SITE HISTORY AND MANAGEMENT - Are records requested during the audit available? - Are any specific considerations to be noted or actions required?	
Section 3	PROPAGATION MATERIAL - Are records requested during the audit available? - Are any specific considerations to be noted or actions required?	
Section 4	FERTILIZER USE - Are records requested during the audit available? - Are any specific considerations to be noted or actions required?	
Section 5	IRRIGATION - Are records requested during the audit available, and are any specific considerations to be noted or actions required?	
Section 6	CROP PROTECTION - Are records requested during the audit available? - Are any specific considerations to be noted or actions required?	
Section 7	HARVESTING - Are records requested during the audit available? - Are any specific considerations to be noted or actions required?	
Section 8	INTEGRATED PEST MANAGEMENT - Prevention - Observation and Monitoring - Intervention	
Section 9	FOOD BIOSECURITY	The term “food biosecurity” relates to the protection of food from bioterrorism. Bioterrorism is the intentional use of biological and chemical agents for the purpose of causing harm. Some government agencies are using the term “food security” instead of “food biosecurity.”

CHECKLIST AND COMPLIANCE CRITERIA - Primary Production and On-farm Produce Handling (AUDITED)				
R/P	Item	Control Point	Level	Compliance Criteria
1.		ON-FARM TRACEABILITY		
R/P	1.1	Is harvested product identified and traceable to where it was produced?	MAJOR	Record the identity of the product in a way that complies with marking requirements and is meaningful to the next entity in the supply chain. - Product type - Cultivar - Date harvested - Holder-container, where applicable. - Field. - FBO Code - Farm Name and address
R/P	1.2	Is the next receiver in the supply chain identified?	MAJOR	Record the identity of the receiving entity - FBO Code. - FBO Code of a processor. - Name and address of the receiver (when applicable). - Transport/transporter details (when applicable). Record the on-farm or off-farm destination(s) of harvested product e.g. FBO Code for an on-farm or off-farm pack house or an on-farm or commercial cold store, or a description.

R/P	Item	Control Point	Level	Compliance Criteria
2. SITE HISTORY AND MANAGEMENT				
R	2.1	Has a risk assessment been conducted for <u>new production sites</u> or existing sites (where the risk status have changed) showing them to be suitable for production?	MINOR	There is a documented food safety risk assessment that takes into account site history, and considers impact of proposed enterprises on adjacent stock/crops in terms of pollution and heavy metal contaminants. When the assessment identifies a risk that is critical to food safety the site must not be used for agricultural activities. Risk assessments should be reviewed annually. Definition of new production sites: Land being used for production or planted for the first time after being used for animal production or non-food uses, excluding “soil-improvement” crops. <u>Determination if risk assessment is needed:</u> <pre> graph TD Q1[1. Is it a new agricultural site?] -- No --> A[No risk to the production system, risk assessment is not needed.] Q1 -- Yes --> Q2[2. Is it possible that previous production processes can cause a risk to the current production?] Q2 -- No --> A Q2 -- Yes --> B[Possible risk, do a risk assessment.] B --> Q3[3. Did environmental factors change that might cause a risk to the current production?] Q3 -- No --> A Q3 -- Yes --> B </pre> <u>Risk assessment must include, but are not limited to:</u> Legislation: Local regulations should be checked first of all to verify legal compliance. Prior use of land: Previous crops, type of use (industrial or military use), Landfill or mining sites, natural vegetation, pests, diseases and weeds. Type of soil: Structural suitability, susceptibility and chemical suitability.
R	2.2	Has a recording system been established to identify each production site (field)?	MAJOR	There are documented records that reference each area covered by a crop with all the agronomic activities related to GAP documentation requirements of this area. No N/A
R/P	2.3	Has a visual identification system, linked to the recording system for individual production sites been implemented?	MINOR	Every field is physically identifiable, e.g. using description, map, landmarks and/or e.g. a unique code, name, number or colour used on all records that refer to that area. No N/A

R/P	Item	Control Point	Level	Compliance Criteria
R	2.4	Does the cultivation record indicate that crop rotation principles are being applied?	MINOR	Continued cultivation on the same land may lead to the build up of populations of <i>A. flavus</i> in soil, increasing probability of infection. Does the cultivation record of groundnut fields indicate that crop rotation principles are being applied? (indicating at least 3 prior crops planted on the same field - including any groundnut crop)
R	2.5	Has the risk of drought stress been mitigated by: - Optimum population ratio considering cultivar characteristics. - Effective weed control	MINOR	Optimum plant populations should be established as too high a plant population may lead to drought stress and infective application of crop protection agents. Does the cultivation record indicate an optimum row and plant spacing? Ideal spacing is between 50 - 75mm for all available cultivars (source: ARC) Does the cultivation record indicate weed and insect control actions? (Cross reference to agro chemical application records, including application on seeds)
3.		PROPAGATION MATERIAL: (NO-GMO VARIETIES ARE USED)		
R	3.1	Has the choice in cultivar been made with consideration of the adaptability in the planting region and to exclude any Genetically Modified seed?	MAJOR	A cultivar should be selected that is suitable for the particular growing season and to mature at the end of the rainy season so that post-harvest drying can be done under favorable conditions. - Norden and Selmani type groundnuts are produced under irrigation only. (source ARC) - Spanish type groundnuts are produced under irrigation and rainfall conditions. (source ARC)
4.		FERTILIZER USE		
4.1		Fertiliser Application Records (Inorganic & Organic)		
R	4.1.1	Have all dates, production sites, fertilizer types, quantities, method for application and operator been recorded?	MINOR	Records are kept of all fertilizer applications detailing the date of application, the name or reference of the field, orchard or greenhouse where the crop is located, trade name, type of fertilizer, quantity and concentration, method of application and the name of the operator that applied it.
4.2		Fertiliser storage (Inorganic & Organic)		
P	4.2.1	Are fertilizers stored separately from produce.	MINOR	Fertilizers are not stored with fresh produce.

R/P	Item	Control Point	Level	Compliance Criteria
P	4.2.2	Are inorganic fertilizers stored appropriately and separate from crop protection products?	MINOR	The minimum requirement is to prevent physical cross contamination between fertilizers (organic and inorganic) and plant protection products by the use of a physical barrier (wall, sheeting, etc.). If fertilizers that are applied together with plant protection products (i.e. micronutrients or foliar fertilizers) are packed in a closed container, they can be stored with plant protection products. The area used for storage must be covered. This should be suitable to protect all inorganic fertilizers, i.e. powders, granules or liquids, from atmospheric influences like sunlight, frost and rain. Plastic coverage could be acceptable. Storage cannot be directly on the soil. It is allowed to store lime and gypsum in the field for a day or two before spreading. The area must be free from waste, must not constitute a breeding place for rodents, and where spillage and leakage is cleared away.
4.3		Organic fertilizer (N/A if not used)		
P	4.3.1	Has the use of human sewage been banned on crops?	CRITICAL	No human sewage to be used on crops. No N/A.
R	4.3.2	Has a food safety risk assessment of the organic fertilizer been carried out, before application?	MINOR	A documentary evidence is available to demonstrate that the following potential risk areas have been taken into account: • crop type • method of treatment/composting • biological and heavy metal content, and • disease transmission, of the organic fertilizer applied, where applicable.
P	4.3.3	Is organic fertilizer incorporated into the soil prior to planting and not applied during the growing season?	MAJOR	Interval between application and harvest does not compromise food safety. Fertilizer application and harvest records should show this.
5.		IRRIGATION		
5.1		Untreated Sewage Water		

R/P	Item	Control Point	Level	Compliance Criteria
P	5.1.1	Is the intentional use of untreated sewage water prohibited on the farm?	MAJOR	Untreated sewage is not used for irrigation/fertigation. Where treated sewage water or reclaimed water is used, water quality complies with the WHO published Guidelines for the Safe Use of Wastewater and Excreta in Agriculture and Aquaculture 1989 (1000 faecal coliforms / 100ml). Also, when there is doubt if water is coming from a possibly polluted source (i.e. because of a village upstream, etc.) the farmer has to demonstrate through analysis that the water complies with the WHO guideline requirements or the local legislation for irrigation water. No untreated sewage water - N/A. <i>Reference Global/G.A.P Guidelines: Table 3 in Annex AF.1 for Risk Assessments.</i>
5.2		Quality of Irrigation water (Only N/A in natural rainfall areas with no irrigation)		
R	5.2.1	Has a risk analysis been performed on the quality of irrigation water, specifically taking into account the microbial content?	MINOR	The risk analysis (not necessarily annual) must consider: - Potential microbial contamination of all sources of irrigation water. - Irrigation method used - The crop type irrigated - Frequency of analysis - Sources of water used for irrigation - When will the risk analysis be reviewed?
R	5.2.2	If the risk assessment so requires, have adverse results been acted upon before the next harvest cycle?	MINOR	How will adverse results be acted upon?
6.		CROP PROTECTION		
6.1		Choice and use of chemicals		
R/P	6.1.1	Are chemical products registered for use on groundnuts, used according to the product label and are workers who handle and apply crop protection products trained and working according to a working procedure?	MAJOR	All chemical products applied to the crop are registered (Act 36 of 1947) and appropriate for the pest, disease, weed or target of the crop protection product intervention. Where applicable, this includes chemical products applied to propagation material (particularly leafy vegetable seedlings).

R/P	Item	Control Point	Level	Compliance Criteria
R/P	6.1.2	Are chemical products used, taking into account local and export (potential country of destination) MRL requirements?	CRITICAL	Updated, applicable default MRL lists. (DAFF website: www.daff.gov.za in "Divisions: Food Safety and Quality Assurance" section) Comply to import country MRL's. Selection plant last season, results
R	6.1.3	Is a spray instruction available indicating how the correct application rate has been calculated and how the chemical product must be prepared according to the label instructions?	MINOR	There is documented evidence that shows that the correct application rate of the crop protection product for the crop to be treated has followed label instructions and has been accurately calculated, prepared and recorded. Records indicate that the required instructions or training program are in place and that there is a copy of the attendance certificates or a signed list of workers who attended the training course. Sub-contracted service providers, also has to be included in the training program.
6.2		Pesticide spray records		
R	6.2.1	Do the application records reflect the following information: - Date of application - Commodity & variety - Identification of production site - Trade name and active ingredients applied - Product quantity/concentration - Name of operator responsible for application & technically responsible person Application machinery/equipment	CRITICAL	- All crop protection product application records specify the name, and variety of crop treated. - All crop protection product application records specify the geographical area, the name or reference of the farm, and the field, orchard or greenhouse where the crop is located. This must include records of surplus mix applications. - All crop protection product application records specify the trade name and active ingredient(s). - All crop protection product application records specify the total amount of product to be applied in weight or volume, or the total quantity of water (or other carrier medium), and dosage in g/l or internationally recognized measures for the crop protection product. - The operator applying crop protection products has been identified in the records. - The application machinery type, for all the crop protection products applied (if there are various units, these are identified individually), and the method used (i.e. knapsack, high volume, U.L.V., via the irrigation system, dusting, fogger, aerial, or another method), are detailed in all crop protection product application records. - The technically responsible person making the crop protection product recommendation has been identified in the records.
R	6.2.2	Have the pre-harvest intervals (withholding periods) been observed for all pesticide spray applications?	CRITICAL	The farmer can demonstrate that all pre-harvest intervals have been observed for crop protection products applied to the crops, through the use of clear documented procedures such as crop protection product application records and crop harvest dates from treated locations. Specifically in continuous harvesting situations, there are systems in place in the field e.g. warnings signs etc., to ensure safe compliance.

R/P	Item	Control Point	Level	Compliance Criteria
6.3		Application equipment		
R/P	6.3.1	Is the application equipment verified before different applications at least on an annual basis?	MINOR	The crop protection product application machinery has been verified for correct operation within the last 12 months.
6.4		Storage of Pesticides (These control points can only be marked as n/a when evidence of sub-contracting of spraying function can be provided to the auditor.)		
P	6.4.1	Is the pesticide store locked, secure and well lit?	MINOR	The crop protection product storage facilities are kept secure under lock and key. The crop protection product storage facilities have or are located in areas with sufficient illumination both by natural and by artificial lighting, to ensure that all product labels can be read easily on the shelves.
P	6.4.2	Are only pesticides, measuring and spraying equipment stored in the pesticide store?	MINOR	Nothing other than the indicated may be found in the room. No food/personal belongings or product or packaging material storage may occur.
P	6.4.3	Is appropriate equipment available for measuring and mixing of pesticides?	MINOR	The crop protection product storage facilities or the crop protection product filling/mixing area if this is different, have measuring equipment whose graduation for containers and calibration verification for scales has been verified annually by the farmer.
P	6.4.4	Is access to the pesticide store limited to authorized personnel?	MINOR	The crop protection product storage facilities are kept locked and physical access is only granted in the presence of persons who can demonstrate formal training in the safe handling and use of crop protection products.
R/P	6.4.5	Is an inventory (register) with at least 3 months worth of history available for all pesticides in the pesticide store?	MINOR	A stock inventory, which indicates the contents of the store, is available and it is updated at least every 6 months.
P	6.4.6	Are all pesticides stored in their original container/packaging?	MINOR	All the crop protection products that are currently in the store are kept in the original containers and packs, in the case of breakage only, the new package must contain all the information of the original label
P	6.4.7	Is the pesticide store properly identified?	MINOR	There are permanent and clear identification signs on or next to the access doors of storage facilities.
R/P	6.4.8	Are obsolete chemical products stored securely and disposed of by the appropriate authorities?	MINOR	There are documented records that indicate that obsolete crop protection products have been disposed of by officially authorized channels. When this is not possible, obsolete crop protection products are securely maintained and identifiable.
6.5		Empty Pesticide Containers		

R/P	Item	Control Point	Level	Compliance Criteria
P	6.5.1	Are empty pesticide containers not reused, pierced, stored securely and disposed of in accordance with national legislation?	MINOR	The system used to dispose of empty crop protection containers ensures that persons cannot come into physical contact with the empty containers by having a secure storage point, safe handling system prior to disposal by a responsible method.
7.		HARVESTING: (This Section can only be marked as n/a if a contract from the company performing the harvesting function includes control point 7.1 – 7.10)		
R/P	7.1.	Is harvesting of the crop done within recommended maturity period after planting period?	MAJOR	Reference documentation as compiled and provided by the ARC to demonstrate knowledge of maturity periods for the specific cultivar. - Difference between planting and harvesting dates on field report relates to optimum cultivation period relevant to the specific cultivar. - If a deviation of more than 20 days exists, the field report should indicate reasons (eg. rain during harvesting, manual maturity test indicated large volume immature kernels etc) - Farmer can explain and/or demonstrate process of manually determining maturity as advocated by ARC or registered seed supplier. Visual confirmation if audit done during harvesting.
R	7.2	Are there records of the weather conditions (temperature, humidity and rainfall) during the harvesting period?	MINOR	- Weather record indicating at least weekly temperature and rainfall on the farm during the cultivation period. - Alternatively, records from the nearest weather station as obtained from Weather SA (only if such a station is within a 50km radius from the farm)
R/P	7.3	Is harvesting (including picking) done in such a way that damage to pods is avoided?	MINOR	- Records of equipment maintenance and proper operation exist. - Record of training for field supervisor and equipment operator exists, including specific reference to the importance of limiting damage to pods. - Visual confirmation if audit done during harvesting.
R	7.4	Is there evidence to show that attempts are made during harvesting to segregate high risk stock (for example plants/pods from areas of the field that might have been waterlogged or exposed to other adverse effects)?	MAJOR	- Field record indicates whether circumstances during harvesting required segregation of high risk stock. - Standard procedure describing how and under which circumstances segregation will take place is available. - Delivery report to buyer indicates any segregation steps taken. - Visual confirmation if audit done during harvesting.

R/P	Item	Control Point	Level	Compliance Criteria
P	7.5	Whilst considering moisture level agreed with buyer, does evidence or records suggest that chosen drying method was effective in achieving optimum and safe moisture prior to delivery/storage?	CRITICAL	- Written evidence of moisture level agreed with buyer to be presented. - Field and delivery report indicates drying method, period of drying, average moisture at time of delivery.
R	7.6	Are vehicles used for transport of harvested produce cleaned and maintained where necessary according to the risk assessment?	MAJOR	Farm vehicles used for transport of harvested produce that are also used for any purpose(s) other than transport of harvested produce, are cleaned and maintained according to a schedule so as to prevent produce contamination (e.g. soil, dirt, organic fertilizer, spills, etc.).
R/P	7.7	Are the containers and tools used for harvesting cleaned, maintained and protected from contamination?	MAJOR	Reusable harvesting containers, harvesting tools (e.g. scissors, knives, pruning shears, etc.) and harvesting equipment (e.g. machinery) are cleaned and maintained. A cleaning and disinfection schedule is in place
R/P	7.8	Are produce containers used exclusively for produce?	MAJOR	Produce containers are only used to contain produce (i.e. no agricultural chemicals, lubricants, oil, cleaning chemicals, plant or other debris, lunch bags, tools etc.) (Visual confirmation by auditor) If multi purpose trailers, carts etc. are used as produce containers, they must be cleaned prior to use. (schedule/record)
R/P	7.9	Are documented instructions and procedures for handling produce to avoid contamination of the product implemented?	MAJOR	There is evidence that the workers are complying with the instructions and procedures. Workers must be trained, using written (in appropriate languages) and/or pictorial instructions, to prevent physical (such as snails, stones, insects, knives, fruit residues, other seeds and commodities, watches, mobile phones etc.), microbiological and chemical contamination of the product during harvesting.

R/P	Item	Control Point	Level	Compliance Criteria
8.	Integrated Pest Management			
<i>Integrated Pest Management (IPM) involves the careful consideration of all available pest control techniques and the subsequent integration of appropriate measures that discourage the development of pest populations, and keeps plant protection products and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. Given the natural variation on pest development for the different crops and areas, any IPM system must be implemented in the context of local physical (climatic, topographical etc), biological (pest complex, natural enemy complex, etc.) and economical conditions.</i>				
Reference GlobalG.A.P Guideline: Annex CB.3 Guideline IPM toolkit				
8.1 to 8.3 Can the producer show evidence of implementation of at least one activity that falls in the category of:				
P/R	8.1	Prevention	Audited/ Not scored	The producer can show evidence of implementing at least one activity that includes the adoption of production practices that could reduce the incidence and intensity of pest attacks, thereby reducing the need for intervention.
P/R	8.2	Observation and Monitoring	Audited/ Not scored	The producer can show evidence of a) implementing at least one activity that will determine when, and to what extent, pests and their natural enemies are present, and b) using this information to plan what pest management techniques are required.
P/R	8.3	Intervention	Audited/ Not scored	The producer show evidence that in situations where pest attacks adversely affects the economic value of a crop, intervention with specific pest control methods will take place. Where possible, non-chemical approaches must be considered.
9		Food Biosecurity		
	9.1	Is there a risk assessment for intentional food contamination and are procedures in place to address identified risks?	Audited/ Not scored	Potential threats to food security in all phases of the operation shall be identified and assessed. Food security risk identification shall assure that all input is from safe and secured sources. Information of all employees and subcontractors must be available. Procedures for corrective action shall be in place in case of intentional threat.



C

**Praktyke vir die Voorkoming en Verlaging van
Aflatoksien Besmetting in Grondbone
CAC/RCP 55-2004**

**Code of Practice for the Prevention and Reduction of
Aflatoxin Contamination in Peanuts
CAC/RCP 55-2004**

CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF AFLATOXIN CONTAMINATION IN PEANUTS

CAC/RCP 55-2004

I. SCOPE

1. This document is intended to provide guidance for all interested parties producing and handling peanuts for entry into international trade for human consumption. All peanuts should be prepared and handled in accordance with the Recommended International Code of Practice – General Principles of Food Hygiene¹, which are relevant for all foods being prepared for human consumption. These codes of practice indicate the measures that should be implemented by all persons that have the responsibility for assuring that food is safe and suitable for consumption.

2. DEFINITIONS

2. **“Blows”** (Pops) means in-shell nuts which are unusually light in weight due to extensive damage from physiological, mould, insect, or other causes and which can be removed, for example, by an air-separation process.
3. **“Curing”** means drying of the in-shell peanuts to a safe moisture level.
4. **“Farmers stock”** peanuts means in-shell peanuts as they come from farms, after separation from the vines by hand and/or mechanical means.
5. **“Safe water activity”** means a water activity of in-shell peanuts and shelled peanuts that will prevent growth of micro-organisms normally present in the harvesting, processing, and storage environment.
6. Water activity (a_w), is a measure of free moisture in a product and is the water vapour pressure of the substance divided by the vapour pressure of pure water at the same temperature. Water activities above 0.70 at 25 degrees Celsius (77 ° Fahrenheit) are ‘unsafe’ as far as growth of *Aspergillus flavus* and *Aspergillus parasiticus* and possible aflatoxin production are concerned.

¹ Recommended International Code of Practice - General Principles of Food Hygiene (CAC/RCP 1- 1969, Rev. 4-2003).

3. RECOMMENDED PRACTICES BASED ON GOOD AGRICULTURAL PRACTICES (GAP)

3.1 Pre-harvest

7. To be effective, pre-harvest control of aflatoxin contamination of peanuts must take into consideration all the varied environmental and agronomic factors that influence pod and seed infection by the aflatoxin-producing fungi, and aflatoxin production. These factors can vary considerably from one location to another, and between seasons in the same location. Some environments may be particularly favourable to fungal infection and subsequent aflatoxin contamination of groundnuts, and in these circumstances it would be necessary to consider whether or not the crop should be grown in such areas. However, for most situations it should be possible to devise agricultural practices that should reduce aflatoxin contamination in peanuts.
8. The continued cultivation of peanuts on the same land may lead to a build-up of high populations of *A. flavus*/*A. parasiticus* in the soil, which will increase the probability of infection and aflatoxin contamination. Some studies have been carried out on the effect of crop rotation on aflatoxin contamination. In semi-arid environments, populations of *Aspergillus* may be very high, and crop rotations may have little influence on the fungal activity. Cropping systems in some regions involve varied cultivation and fertiliser practices that individually or taken together may affect survival or build-up populations of the toxigenic fungi. There is evidence that peanuts grown in different soil types may have significantly different levels of infection by the moulds. Light sandy soils, for example, favour rapid proliferation of the fungi, particularly under dry conditions. Heavier soils have a higher water-holding capacity and, therefore, there is less likelihood of drought stress occurring, which may be partly responsible for the lower than average levels of aflatoxin contamination in peanuts grown on such soils.
9. In areas that are vulnerable to erosion, no-till practices may be required in the interests of soil conservation.
10. Utilize the results of soil tests to determine if there is a need to apply fertilizer and/or soil conditioners to assure adequate soil pH and plant nutrition to avoid plant stress, especially during seed development, which makes peanuts more susceptible to fungal infestation.
11. The choice of peanut variety can be important and therefore before planting, farmers should consult with the appropriate plant breeding authorities or agricultural extension services to ascertain the peanut cultivars that have been adapted to their region, and the availability of varieties that are resistant to

various factors such as insect attack and microbial and fungal attack that can have an impact on the safety and quality of the peanuts produced. A cultivar should be selected that is suitable for a particular growing season and mature at the end of the rainy season so that post-harvest field drying can be done under favourable conditions. It is undesirable that a variety should suffer from drought stress during pod maturation and some compromise may have to be effected between harvesting under dry conditions and avoidance of drought stress by using short-duration cultivars that mature before the rains have ended.

12. Irrigation, if feasible, is recommended to combat heat and drought stress.
13. Irrigation to ensure adequate soil moisture during the last 4-6 weeks of crop growth should minimize pre-harvest aflatoxin contamination of peanuts. This may be achieved by growing a completely irrigated crop or by applying supplementary irrigation to a basically rain-fed crop. If irrigation is used, ensure that it is applied evenly and that all plants in the plot have an adequate supply of water.
14. Water used for irrigation and other purposes (e.g. preparation of pesticide sprays) should be of suitable quality for the intended use.
15. Avoid overcrowding of plants by maintaining the recommended row and intra-plant spacing for the species/varieties grown. Optimum plant populations should be established bearing in mind that too high a population may lead to drought stress where rainfall maybe below the optimum required in a growing season.
16. Excessive weed growth may deplete available soil moisture. Effective weed control by use of registered herbicides, or cultivation is therefore advisable. Care should be taken during cultivation to avoid damage to pegs and pods.
17. Cultivation and crop protection practices that lower the incidence of soil insects, mites, and nematodes should help in reducing aflatoxin contamination. Minimize insect damage and fungal infection in the vicinity of the crop by proper use of registered insecticides, fungicides, and other appropriate practices within an integrated pest management program. Growers should consult with local or national authorities to determine insects and other pests that are commonly found in their region that might attack peanuts causing them to be more susceptible to fungal infections that can lead to aflatoxin production.
18. No fungicide, or combinations of fungicides, or other chemical treatments appear to have been adopted for the practical control of *A. flavus*/*A. parasiticus* infection and subsequent aflatoxin contamination of peanuts pre-harvest. The results of

studies on the application of fungicides on freshly harvested or windrowed peanuts are equivocal.

3.2 Harvest

19. Trade associations as well as local and national authorities should take the lead in informing growers of the hazards associated with aflatoxin contamination of peanuts and how they may practice safe harvesting procedures to reduce the risk of contamination by fungi, microbes, and pests. Personnel who will be involved in harvesting peanuts should be well-trained in the personal hygienic and sanitary practices that must be implemented throughout the harvesting season.
20. Make sure that all equipment, which is to be used for harvesting and storage of crops, is functional. A breakdown during this critical period may cause peanut quality losses and enhance aflatoxin formation. Keep important spare parts available on the farm to minimize time loss from repairs.
21. Plan to harvest the peanuts at full maturity, unless allowing the crop to continue to full maturity would subject it to extreme heat, rainfall, and drought conditions. It is very important to harvest the crop at optimum maturity, as excessive numbers of over-mature or very immature pods at harvest can be reflected in high levels of aflatoxin in the product also delayed harvest of peanuts already infected may cause significant increase in aflatoxin content of the crop. A system by which the growing conditions of the farming crop is monitored (soil temperature and precipitation) may be very useful.
22. Individual plants that die from attack by pests, pathogens, such as *Sclerotium rolfsii* or *Fusarium* spp., and diseases, e.g. rosette virus, or insects, such as termites, earwigs, and false wireworms that cause damage to the pods, should be harvested separately as their produce is likely to contain aflatoxin.
23. If peanuts have been irrigated, care should be taken to separately harvest peanuts that are beyond the reach of irrigation systems to avoid mixing aflatoxin-free peanuts with those that are potentially contaminated.
24. Damage to pods at the time of harvest should be avoided as much as possible since this can lead to rapid invasion of the pods by *A. flavus*/*A. parasiticus*. Peanuts should be handled as gently as possible and every effort made to minimize physical damage at all stages of harvesting and transportation procedures.
25. After harvest, pods should be exposed for maximum rate of drying. This may be accomplished by turning the vines to leave the pods uppermost where they are

away from the ground and exposed to sun and wind. Curing should be completed as soon as possible to a safe water activity so as to prevent the growth of microorganisms, particularly moulds that produce aflatoxins. However, drying too rapidly may cause skin slippage and off-flavours in the peanut kernels. When curing by supplemental heat, excessive heat should be avoided since this impairs the general quality of the peanuts, e.g. splitting of kernels after shelling. Close checks of moisture content/water activity of lots of farmer's stock peanuts should be maintained.

26. Peanuts should be dried in such a manner that damage to the peanuts is minimized and moisture levels are lower than those required to support mould growth during storage (generally less than 10%). This is necessary to prevent further growth of a number of fungal species in peanuts.
27. Freshly harvested peanuts should be cleaned and sorted to remove damaged nuts and other foreign matter. Cleaning procedures such as density separators or air legs to remove light pods and slotted screens to remove pre-shelled kernels, may remove some infected nuts.

3.3 Transport

28. The nuts should be moved to a suitable storage, or to the processing area for immediate processing as soon as possible after harvesting or drying.
29. Containers (e.g. wagons, trucks) to be used for collecting and transporting the harvested peanuts from the farm to drying facilities, or to storage facilities after drying, should be clean, dry, and free of insects and visible fungal growth before use and re-use.
30. Transport containers should be dry and free of visible fungal growth, insects, and any contaminated material. As necessary, transport containers should be cleaned and disinfected before use and re-use and be suitable for the intended cargo. The use of registered fumigants or insecticides may be useful. At unloading, the transport container should be emptied of all cargo and cleaned as appropriate.
31. Consignments of peanuts should be protected from all additional moisture by using covered or airtight containers or tarpaulins. Avoid temperature fluctuations that may cause condensation to form on the peanuts, which could lead to local moisture build-up and consequent fungal growth and aflatoxin formation.
32. Farmers' stock peanuts should be screened for aflatoxin contamination to more accurately segregate for proper storage. Aflatoxin-free loads should be

segregated from loads with low levels of aflatoxin contamination, destined for subsequent processing and clean-up, and from loads that are highly contaminated.

33. Avoid insect, bird, and rodent infestation during transportation by the use of insect and rodent proof containers or insect and rodent repellent chemical treatments provided they are approved for the intended use of the peanuts.

3.4 Segregation of aflatoxin contaminated lots

34. The distribution of aflatoxin in peanuts has been thoroughly investigated. The results from the investigations indicate that sorting for quality removes a large part of the aflatoxin present at harvest. The distribution of aflatoxins is very heterogeneous in a lot of peanuts and consequently the sampling plan used is critical.

3.5 Storage

35. Post-harvest storage of peanuts is the phase that can contribute most to the aflatoxin problem in peanuts. The primary goal for aflatoxin prevention in storage is to prevent mould development of the peanuts due to condensation or leaks in the warehouse.
36. A properly ventilated warehouse with a good roof, preferably double sidewalls and a concrete floor are required to prevent rewetting of peanuts. Make sure that the storage facilities include dry, well-vented structures that provide protection from rain, drainage of ground water, protection from the entry of insects, rodents, and birds, and minimum temperature fluctuations. Painting warehouse roofs with white paint reduces solar heat load when compared to conventional galvanized material. The double roofing concept of installing a new roof over a defective, existing roof with an air space in-between the two roofs, has proven effective in controlling warehouse condensation.
37. Water activity, which varies with moisture content and temperature, should be carefully controlled during storage.
38. Uniform loading of the warehouse allows excessive heat and moisture to escape and reduces favourable areas for insect infestation. Stock piling of peanuts can cause heat build-up and moisture accumulation with resultant mould growth and aflatoxin contamination.
39. Prevention of aflatoxin increase during storage and transportation depends on
- 6 keeping a low moisture content, the temperature in the environment, and the

hygienic conditions. *A. flavus*/*A. parasiticus* cannot grow or produce aflatoxins at water activities less than 0.7; relative humidity should be kept below 70% and temperatures between 0 and 10 °C are optimal for minimizing deterioration and fungal growth during long time storage.

40. The aflatoxin level in peanuts coming into a storage and peanuts going out of a storage should be monitored, using appropriate sampling and testing programs.
41. For bagged peanuts, ensure that bags are clean, dry, and stacked on pallets or incorporate a water impermeable layer between bags and the floor.
42. Store at the lowest temperature possible consistent with ambient conditions but avoid temperatures near freezing point. Where possible aerate the peanuts by circulation of air through the storage area to maintain proper and uniform temperature levels throughout the storage area.
43. Measure the temperature of the stored peanuts at several fixed intervals during storage. A temperature rise may indicate microbial growth and/or insect infestation. Visually check peanuts for evidence of mould growth. Separate the apparently infected portions of the peanuts and send samples for analysis if possible. When separated, lower the temperature in the remaining peanuts and aerate. Avoid using infected peanuts for food or feed production.
44. Use good 'housekeeping' procedures to minimize levels of insects and fungi in storage facilities. This may include the use of suitable traps, registered insecticides or fungicides and fumigants. Care should be taken to select only those chemicals that will not affect or cause harm to the peanuts.
45. Document the harvesting and storage procedures implemented each season by making notes of measurements (e.g. temperature, moisture, and humidity) and any deviation or changes from traditional practices. This information may be very useful for explaining the causes of fungal growth and aflatoxin formation during a particular crop year and help to avoid similar mistakes in the future.

4. GOOD MANUFACTURING PRACTICE (GMP)

4.1 Receiving and shelling

46. A buyer for a shelling plant, whether located at the plant or at an outlying buying point, should monitor the quality of peanuts offered to him and assist suppliers in eliminating improper practices. Buyers should encourage suppliers of farmer's stock peanuts to follow good production practices as described herein.

47. Farmers' stock peanuts received at the shelling plant should be inspected on arrival. It is advisable to know the origin and history of each lot of peanuts. The transport vehicle should be examined. If the vehicle is not fully enclosed, it should have a covering such as tarpaulin to keep out rain or other forms of water. The general appearance of the peanuts should be observed during the process of unloading. If the peanuts are wet to the touch, they should NOT be mixed with peanuts in a bulk warehouse. The vehicle which contains the peanuts should be set aside until a decision is made for their disposal. If possible, remove a sample from each lot, separate the "loose shelled" kernels and shell the remainder for peanut grade observation before an acceptance decision is made.
48. Specifications for the purchase of peanuts intended for further processing should include a maximum level for aflatoxin based in appropriate methods of analysis and a proper sampling plan.
49. Special precautions must be taken to reject peanuts showing signs of insect damage or mould growth because of the danger of their containing aflatoxins. Aflatoxin test results should be known before allowing lots of raw peanuts to be processed. Any lot of raw peanuts with unacceptable levels of aflatoxins, which cannot be reduced to permitted levels by the available sorting equipment, should not be accepted.
50. The peanut processor must satisfy himself that the supplier of shelled peanuts is able to control properly his own operations to assure that the finished product is within the maximum limit for aflatoxin.
51. Examine all loose-shelled, damaged "Blows" and under-sized kernels for possible presence of mould. If no external mould is visible, split the kernels to disclose possible hidden mould growth. Excessive mould or presence of mould resembling *A. flavus* warrants a chemical test for aflatoxin or rejection of the lot.

4.2 Sorting

52. Sorting is the final step for removing defective kernels. Sorting belts should be well lighted, with peanuts passing through no more than one layer deep, and operated at a speed which enable hand sorters to assure effective removal of foreign material and defective kernels. Sorting machines should be adjusted as often as practicable against standards to assure removal of all defective kernels. Adjustment should be checked frequently and regularly.

53. To remove mould-contaminated nuts effectively, sorting should be performed before and after blanching and roasting. Where splitting is part of the processing

operation, nuts that resist splitting should be removed. The effectiveness of sorting techniques should be checked by regular aflatoxin analyses of the sorted peanuts stream or of the finished product, or both. This should be done frequently enough to ensure that the product is completely acceptable.

54. Defective (mouldy, discoloured, rancid, decayed, shrivelled, insect or otherwise damaged) kernels should be bagged separately and tagged as unsuitable for human consumption. Containers of defective peanuts should be removed as soon as practicable from the processing area. Materials which carry the danger of contamination by aflatoxin, or which are contaminated should be diverted to non-food uses.
55. Rejected peanuts from the sorting procedure should be destroyed or segregated from edible products. If they are to be used for crushing, they should be separately bagged and tagged as unsuitable for direct human consumption in their present state.

4.3 Blanching

56. Blanching used in conjunction with gravity tables and manual or electronic sorting is very efficient in removing aflatoxin-contaminated kernels. Colour sorting, combined with blanching have been shown to reduce aflatoxin contamination by as much as 90%.

4.4 Packaging and storage of end product

57. Peanuts should be packed in clear jute bags, cartons or polypropylene bags. If using jute, ensure bags are not treated with mineral hydrocarbon based oils. All bags/cartons should be lot identified to facilitate traceability of the product before being moved to controlled storage facilities or transported.
58. Peanuts that have been processed should be stored and transported under such conditions as will maintain the integrity of the container and the product within it. Carriers should be clean, dry, weatherproof, free from infestation, and sealed to prevent water, rodents or insects from reaching the peanuts. Peanuts should be loaded, held and unloaded in a manner that protects from damage or water. Well-insulated carriers or refrigerated vehicles are recommended for transport when climatic conditions indicate such a need. Extreme care should be taken to prevent condensation when unloading peanuts from cold storage or from a refrigerated vehicle. In warm, humid weather, the groundnuts should be allowed to reach ambient temperature before exposure to external conditions. This tempering may require 1-2 days. Peanuts that have been spilled are vulnerable to contamination and should not be used for edible products.

5. A COMPLEMENTARY MANAGEMENT SYSTEM TO CONSIDER IN THE FUTURE

59. The Hazard Analysis Critical Control Point (HACCP) system is an all-encompassing integrated food safety management system that is used to identify and control hazards within the production and processing system. The general principles of HACCP have been described in several documents.
60. When properly implemented, this system should result in a reduction of the levels of aflatoxins in peanuts. The use of HACCP as a food safety management system has many benefits over the types of management control systems in some segments of the food industry. At farm level there are many factors that influence the aflatoxin contamination of peanuts most of which are environmentally related, such as weather and insects, and these are difficult, if not impossible, to control. Particular attention should be paid to the soil population of the fungus, the health of seed material, soil moisture deficit stress at the pod formation and pod maturity stages, and rains at harvest. The critical control points often do not exist at the pre-harvest level. However, after harvesting, the critical control points may be identified for aflatoxins produced by fungi during drying and storage. For example a critical control point could be at the end of the drying process and one critical limit would be the water content/water activity.
61. It is recommended that resources be directed to emphasizing the Good Agricultural Practices (GAPs) at the pre-harvest level and during drying and storage and Good Manufacturing Practices (GMPs) during the processing and distribution of various products. A HACCP system should be built on sound GAPs and GMPs.
62. Integrated mycotoxin control programs should incorporate HACCP principles in the control of risks associated with mycotoxin contamination of foods and feeds. The implementation of HACCP principles will minimize aflatoxin contamination of peanuts through applications of preventive controls to the extent feasible in the production, handling storage and processing of each peanut crop.



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**Codex Alimentarius: Voorgestelde
Internasionale Standaard vir Higiëniese
Praktyk vir Grondbone
CAC/RCP 22-1979**

**Codex Alimentarius Recommended
International Code of Hygienic Practice for
Groundnuts
CAC/RCP 22-1979**

RECOMMENDED INTERNATIONAL CODE OF HYGIENIC PRACTICE FOR GROUNDNUTS (PEANUTS)

CAC/RCP 22-1979

1. SCOPE

1.1 This Code of Hygienic Practice applies to groundnuts, also known as peanuts, monkey nuts or earth nuts (*Arachis hypogaea* L).

It contains the minimum requirements of hygiene for farm handling, transportation, storage, in-shell operations and commercial shelling. It covers all types and forms of raw, dried groundnuts (peanuts) in-shell and shelled.

2. DESCRIPTION

2.1 Definitions

Blows (pops) means in-shell nuts which are unusually light-weight due to extensive damage from physiological, mould, insect, or other causes and which can be removed, for example, by an air-separation process.

2.2 **Curing** means drying of in-shell groundnuts (peanuts) to a safe moisture level.

2.3 **Farmer's stock groundnuts (peanuts)** means in-shell groundnuts (peanuts) as they come from the farm, after separation from the vines by hand and/or mechanical means.

2.4 **Safe water activity** means a water activity of in-shell and shelled groundnuts (peanuts) that will prevent growth of micro-organisms normal to the nut harvesting, processing and storage environment. Water activity (a_w) is a measure of free moisture in a product and is the water vapour pressure of the substance divided by the vapour pressure of pure water at the same temperature. An a_w exceeding 0.70 at 25°C (77°F) is unsafe.

3. HYGIENE REQUIREMENTS IN PRODUCTION/HARVESTING AREAS

3.1 Environmental Hygiene in Areas from which Raw Materials are derived

3.1.1 Unsuitable growing or harvesting areas

Food should not be grown or harvested where the presence of potentially harmful substances would lead to an unacceptable level of such substances in the food.

3.1.2 Protection from contamination by wastes

Adequate precautions should be taken to ensure that human and animal wastes are disposed of in such a manner as not to constitute a public health or hygiene hazard, and extreme care should be taken to protect the products from contamination with these wastes. Vine and groundnuts waste should not be permitted to accumulate in such a manner as to promote mould growth or to attract rodents or insects.

3.1.3 **Irrigation control**

Food should not be grown or produced in areas where the water used for irrigation might constitute a health hazard to the consumer through the food.

3.1.4 **Pest and disease control**

Control measures involving treatment with chemical, physical or biological agents should only be undertaken by or under direct supervision of personnel who have a thorough understanding of the potential hazards to health, particularly those which may arise from residues in the food. Such measures should only be carried out in accordance with the recommendations of the official agency having jurisdiction.

3.2 **Harvesting and Production**

3.2.1 **Curing**

After being dug, pods should be exposed for maximum rate of drying. This may be accomplished by turning the vines to leave the pods uppermost where they are away from the ground and exposed to sun and wind. Curing should be completed as rapidly as possible to a safe water activity so as to prevent growth of microorganisms, particularly moulds that produce aflatoxins. When curing by supplemental heat, excessive heat should be avoided since this impairs the general quality of the nuts, e.g. splitting of kernels after shelling. Close checks of moisture content or water activity of lots of farmer's stock groundnuts should be maintained. (see sub-section 7.8.2.1 for relationship between safe water activity and moisture level measurements).

3.2.2 **Techniques**

Methods and procedures associated with harvesting and production should be hygienic and such as not to constitute a potential health hazard or result in contamination of the product.

3.2.3 **Equipment and containers**

Equipment and containers used for harvesting and production should be so constructed and maintained as not to constitute a hazard to health. Containers which are re-used should be of such material and construction as will permit easy and thorough cleaning. They should be cleaned and maintained clean and, where necessary, disinfected. Containers previously used for toxic materials should not subsequently be used for holding foods or food ingredients.

3.2.4 **Removal of obviously unfit materials**

Damaged or imperfect groundnuts and lots that contain any obvious contamination with human or animal wastes, insect infestation, decomposition, broken shells, embedded dirt, blows, or other defects to an extent which would render them unfit for human consumption, should be segregated during harvesting and

production to the fullest extent practicable. Such segregated unfit groundnuts should be disposed of in such a place and in such a manner as to avoid contamination of sound nuts, water supplies, or other crops.

3.2.5 Protection of groundnuts from contamination

Suitable precautions should be taken to protect the nuts from contamination by domestic animals, rodents, birds, insects, mites and other arthropods, or other biological agents, or with chemical or other objectionable substances during handling and storage. The nuts should be moved to suitable storage, or to the processing area for immediate processing, as soon as possible after harvesting or drying. Where nuts are likely to become infested with insects, mites (and other arthropods) during or after harvesting, suitable treatment such as fumigation or application of a pesticide spray should be carried out as a preventive measure. Nuts should be stored in covered containers, buildings, or under covering (e.g. pyramid stacking). Fumigation or spray methods and chemicals used should be approved by the official agency having jurisdiction. High humidities which are conducive to proliferation of mould and elaboration of aflatoxins should be avoided in storage areas in order to maintain groundnuts at a safe moisture level (see sub-section 7.8.2).

3.3 Transportation

3.3.1 Conveyances

Conveyances for transporting the harvested crop from the place of harvest or storage should be adequate for the purpose intended and should be of such material and construction as will permit thorough cleaning and treatment with pesticides and should be so cleaned and maintained as not to constitute a source of contamination to the product. In addition, bulk transport such as ship or rail car should be well ventilated with dry air to remove moisture resulting from respiration of the groundnuts and to prevent moisture condensation as the vehicle moves from warm to cool regions or from day to night.

3.3.2 Handling procedures

All handling procedures should be such as will prevent the product from becoming contaminated. Extreme care should be taken in transporting groundnuts with an unsafe moisture level to prevent spoilage or deterioration. (See also applicable parts of sub-section 7.8.2.1).

3.4 Shelling Plant

3.4.1 Purchasing of farmer's stock

Most of the damage may have already been done to the groundnuts during growing, harvesting, curing, handling and storage. A buyer for a shelling plant, whether located at the plant or at an outlying commission buying point, should monitor the quality of ground nut lots offered to him, and with the Government advisory agencies assist suppliers in eliminating improper practices. Buyers should encourage suppliers of farmer's stock groundnuts to follow good production practices as described herein.

3.4.2 Receiving and inspection

Farmer's stock groundnuts received at the shelling plant should be inspected on arrival. It is advisable to know the origin and history of each lot of groundnuts. The transport vehicle should be examined for cleanliness, insect infestation, dampness or unusual odours. If the vehicle is not fully enclosed, it should have available a covering such as a tarpaulin to keep out the rain or other forms of water. The general

appearance of the groundnuts should be observed during the process of unloading. If the groundnuts are wet to the touch, insect infested, insect damaged, or contain an unusual amount of dirt, debris or other foreign material, they should not be co-mingled with known good groundnuts in a bulk warehouse. The vehicle which contains groundnuts should be set aside until a decision is made for their disposal. If possible, remove a sample from each lot, separate the "loose shelled" kernels and shell the remainder for groundnuts grade observation before an acceptance decision is made. Examine all loose shelled, damaged and under-sized kernels for possible presence of mould. If no external mould is seen, split the kernels to disclose possible hidden mould growth. Excessive mould or presence of mould resembling *A. flavus* warrants a chemical test for aflatoxin or rejection of the lot.

If the groundnuts are to be stored in a bulk warehouse or storage bin, the warehouse or bin should be thoroughly cleaned of all debris and extraneous material and fumigated or otherwise treated with a pesticide before use, if necessary. Groundnuts should not be stored in a warehouse containing any openings which may permit entrance of rodents or birds or which may have leaks in the roof or walls that can allow the rain to enter. The warehouse should be checked frequently for leaks or infestation, both before and after filling. To prevent condensation drippage, warehouses should be ventilated as, for example, by screening around tops or eaves. (see also sub-section 7.1.2).

3.4.3 Unloading equipment and area

Unloading equipment such as an unloading hopper, conveyor belt, bucket elevator, and dirt removing equipment should be so designed as to prevent accumulation of debris. Only areas which can be easily inspected and cleaned should be used for processing groundnuts. A programme of periodic cleaning together with preventive pest control measures should be carried out. Groundnuts should be handled so as to avoid cracking or tearing of hulls which may permit damage to the kernels.

3.4.4 Precleaning

The maximum possible amount of dust and dirt should be removed from the farmer's stock groundnuts before they enter the shelling plant. Sand screens and aspirators will take out much of the dust and dirt and improve the overall sanitation of the shelling plant. The maximum possible amount of foreign material, loose shell, loose kernels and blows should be removed. Foreign material not removed by the cleaner can cause mechanical problems by clogging the sheller, as well as by requiring more picking and sorting of the shelled groundnuts. Removal of loose kernels and blows before shelling will improve the quality of the groundnuts as well as the sheller and plant performance.

3.4.5 Shelling and sizing

All foreign material should be removed from the shelled groundnuts (using stoners, magnets, sorters, etc.). The shelled groundnuts should be continuously inspected to determine whether the plant equipment is performing properly and the groundnuts are free of foreign material, damage and contamination. Any equipment adjustments indicated by the inspection should be made promptly.

Once the shelled groundnuts are size graded, additional stoning should be done in order to remove small light stones, dirt balls and other foreign material which could not be removed in the farm stock stoners. Special care should be taken to avoid overloading size grading equipment.

3.4.6 Sorting

Sorting is the final step for removing debris and defective kernels. It can be done by hand picking or

photo-electric sorting machines or a combination of both. Sorting belts should be well lighted, loaded no more than one layer deep, and operated at a speed and with the number of sorters to assure removal of foreign material and defective kernels. Photo-electric sorting machines should be adjusted as often as practicable against standards selected to assure removal of foreign material and defective kernels. Adjustment should be checked frequently and regularly. One contaminated kernel may contain sufficient aflatoxin to endanger as many as 10.000 co-mingled kernels. Foreign material and defective kernels (mouldy, discoloured, rancid, decayed, shrivelled, insect or otherwise damaged) should be bagged separately - and tagged as unsuitable for human or animal consumption. Containers of defective groundnuts should be removed as soon as practicable from the processing room. Materials which carry the danger of contamination by aflatoxin, or which are contaminated, should be detoxified or destroyed.

3.4.7 Cleaning of special areas

3.4.7.1 Boots or wells of elevators accumulate groundnuts and ground nut material. Accumulated material should be removed and the boots/wells cleaned and sprayed and/ or fumigated as necessary to prevent insect and rodent infestation. Fumigation or spray methods and chemicals used should be approved by the official agency having jurisdiction.

3.4.7.2 Canvas conveyor belts will accumulate product between belt and conveyor pan. Pulleys can accumulate crushed material. Underside of moulding on conveyors can accumulate particles of groundnuts. These areas should be cleaned and sprayed and/or fumigated on a regular basis to prevent insect and rodent infestation.

3.4.7.3 Storage and surge hoppers should be cleaned and sprayed between runs.

3.4.7.4 Every piece of machinery whether open or enclosed should be cleaned of lodged material on a regular schedule.

3.4.7.5 The area immediately surrounding the plant should be kept clean of all debris that might attract insects, rodents or birds and subjected to an adequate pest control programme.

3.4.7.6 Dry clean-up procedures should be utilized to avoid wet spots in which micro-organisms can propagate and contaminate contacted groundnuts kernels. Even though water may not be used directly on equipment, spray and elevated humidity from continuous use can increase moisture in organic matter trapped in crevices in equipment, such as conveyors, to the point where micro-organisms can proliferate.

4. ESTABLISHMENT: DESIGN AND FACILITIES

4.1 Location

Establishments should be located in areas which are free from objectionable odours, smoke, dust or other contaminants and are not subject to flooding.

4.2 Roadways and Areas used by Wheeled Traffic

Such roadways and areas serving the establishment which are within its boundaries or in its immediate vicinity should have a hard paved surface suitable for wheeled traffic. There should be adequate drainage and provision should be made to allow for cleaning.

4.3 Buildings and Facilities

- 4.3.1 Buildings and facilities should be of sound construction and maintained in good repair.
- 4.3.2 Adequate working space should be provided to allow for satisfactory performance of all operations.
- 4.3.3 The design should be such as to permit easy and adequate cleaning and to facilitate proper supervision of food hygiene.
- 4.3.4 The buildings and facilities should be designed to prevent the entrance and harbouring of pests and the entry of environmental contaminants such as smoke, dust, etc.
- 4.3.5 Buildings and facilities should be designed to provide separation, by partition, location or other effective means, between those operations which may cause cross-contamination.
- 4.3.6 Buildings and facilities should be designed to facilitate hygienic operations by means of a regulated flow in the process from the arrival of the raw material at the premises to the finished product, and should provide for appropriate temperature conditions for the process and the product.
- 4.3.7 In food handling areas:

Floors, where appropriate, should be of water-proof, non-absorbent, washable, non-slip and non-toxic materials, without crevices, and should be easy to clean and disinfect. Where appropriate, floors should slope sufficiently for liquids to drain to trapped outlets.

Walls, where appropriate, should be of water-proof, non-absorbent, washable and non-toxic material and should be light coloured. Up to a height appropriate for the operation they should be smooth and without crevices, and should be easy to clean and disinfect. Where appropriate, angles between walls, between walls and floors and between walls and ceilings should be sealed and coved to facilitate cleaning.

Ceilings should be so designed, constructed and finished as to prevent the accumulation of dirt and minimize condensation, mould development and flaking, and should be easy to clean.

Windows and other openings should be so constructed as to avoid accumulation of dirt and those which open should be fitted with screens. Screens should be easily movable for cleaning and kept in good repair. Internal window sills, if present, should be sloped to prevent use as shelves.

Doors should have smooth, non-absorbent surfaces and, where appropriate, be self-closing and close fitting.

Stairs, lift cages and auxiliary structures such as platforms, ladders and chutes should be so situated and constructed as not to cause contamination to food. Chutes should be constructed with inspection and cleaning hatches.

- 4.3.8 In food handling areas all overhead structures and fittings should be installed in such a manner as to avoid contamination directly or indirectly of food and raw materials by condensation and drip, and should not hamper cleaning operations. They should be insulated, where appropriate, and be so designed and finished as to prevent the accumulation of dirt and to minimize condensation, mould development and flaking. They should be easy to clean.

4.3.9 Living quarters, toilets and areas where animals are kept should be completely separated from and should not open directly on to food handling areas.

4.3.10 Where appropriate, establishments should be so designed that access can be controlled.

4.3.11 The use of material which cannot be adequately cleaned and disinfected, such as wood, should be avoided unless its use would clearly not be a source of contamination.

4.4 Sanitary Facilities

4.4.1 Water supply

An ample supply of water, in compliance with sub-section 7.3 of the *General Principles of Food Hygiene* (CAC/RCP 1-1969), under adequate pressure and of suitable temperature should be available with adequate facilities for its storage, where necessary, and distribution, and with adequate protection against contamination.

4.4.1.2 **Non-potable water** used for steam production, refrigeration, fire control and other similar purposes not connected with food should be carried in completely separate lines, identifiable preferably by colour, and with no cross-connection with or backsiphonage into the system carrying potable water.

4.4.2 Effluent and waste disposal

Establishments should have an efficient effluent and waste disposal system which should at all times be maintained in good order and repair. All effluent lines (including sewer systems) should be large enough to carry peak loads and should be so constructed as to avoid contamination of potable water supplies.

4.4.3 Changing facilities and toilets

Adequate, suitable and conveniently located changing facilities and toilets should be provided in all establishments. Toilets should be so designed as to ensure hygienic removal of waste matter. These areas should be well lit, ventilated and, where appropriate, heated and should not open directly on to food handling areas. Hand washing facilities with warm or hot and cold water, a suitable hand-cleaning preparation, and with suitable hygienic means of drying hands, should be provided adjacent to toilets. Where hot and cold water are available mixing taps should be provided. Where paper towels are used, a sufficient number of dispensers and receptacles should be provided near to each washing facility. Taps of a non-hand operable type are desirable. Notices should be posted directing personnel to wash their hands after using the toilet.

4.4.4 Hand washing facilities in processing areas

Adequate and conveniently located facilities for hand washing and drying should be provided wherever the process demands. Where appropriate, facilities for hand disinfection should also be provided. Warm or hot and cold water and a suitable hand-cleaning preparation should be provided. Where hot and cold water are available mixing taps should be provided. There should be suitable hygienic means of drying hands. Where paper towels are used, a sufficient number of dispensers and receptacles should be provided adjacent to each washing facility. Taps of a non-hand operable type are desirable. The facilities should be furnished with properly trapped waste pipes leading to drains.

4.4.5 Disinfection facilities

Where appropriate, adequate facilities for cleaning and disinfection of working implements and equipment should be provided. These facilities should be constructed of corrosion-resistant materials, capable of being easily cleaned, and should be fitted with suitable means of supplying hot and cold water in sufficient quantities.

4.4.6 Lighting

Adequate natural or artificial lighting should be provided throughout the establishment. Where appropriate, the lighting should not alter colours and the intensity should not be less than:

540 lux (50 foot candles) at all inspection points

220 lux (20 foot candles) in work rooms

110 lux (10 foot candles) in other areas.

Light bulbs and fixtures suspended over food materials in any stage of production should be of a safety type and protected to prevent contamination of food in case of breakage.

4.4.7 Ventilation

Adequate ventilation should be provided to prevent excessive heat, steam condensation and dust and to remove contaminated air. The direction of the air flow should never be from a dirty area to a clean area. Ventilation openings should be provided with a screen or other protecting enclosure of non-corrodible material. Screens should be easily removable for cleaning.

4.4.8 Facilities for storage of waste and inedible material

Facilities should be provided for the storage of waste and inedible material prior to removal from the establishment. These facilities should be designed to prevent access to waste or inedible material by pests and to avoid contamination of food, potable water, equipment and buildings or roadways on the premises.

4.5 Equipment and Utensils

4.5.1 Materials

All equipment and utensils used in food handling areas and which may contact food should be made of material which does not transmit toxic substances, odour or taste, is non-absorbent, is resistant to corrosion and is capable of withstanding repeated cleaning and disinfection. Surfaces should be smooth and free from pits and crevices. The use of wood and other materials which cannot be adequately cleaned and disinfected should

be avoided except when their use would clearly not be a source of contamination. The use of different materials in such a way that contact corrosion can occur should be avoided.

4.5.2 Sanitary design, construction and installation

4.5.2.1 **All equipment and utensils** should be so designed and constructed as to prevent hygienic hazards and permit easy and thorough cleaning and disinfection and, where practicable, be visible for inspection. Stationary equipment should be installed in such a manner as to permit easy access and thorough cleaning.

4.5.2.2 **Containers for inedible material and waste** should be leak-proof, constructed of metal or other suitable impervious material which should be easy to clean or disposable and able to be closed securely.

4.5.2.3 **All refrigerated spaces** should be equipped with temperature measurement or recording devices.

4.5.3 Equipment identification

Equipment and utensils used for inedible materials or waste should be so identified and should not be used for edible products.

5. ESTABLISHMENT: HYGIENE REQUIREMENTS

5.1 Maintenance

The buildings, equipment, utensils and all other physical facilities of the establishment, including drains, should be maintained in good repair and in an orderly condition. As far as practicable, rooms should be kept free from steam, vapour and surplus water.

5.2 Cleaning and Disinfection

5.2.1 Cleaning and disinfection should meet the requirements of this Code. For further information on cleaning and disinfection procedures see Appendix I of the *General Principles of Food Hygiene* (CAC/RCP 1-1969) referred to in sub-section 4.4.1.1 of this Code.

5.2.2 To prevent contamination of food, all equipment and utensils should be cleaned as frequently as necessary and disinfected whenever circumstances demand.

5.2.3 Adequate precautions should be taken to prevent food from being contaminated during cleaning or disinfection of rooms, equipment or utensils by water and detergents or by disinfectants and their solutions. Detergents and disinfectants should be suitable for the purpose intended and should be acceptable to the official agency having jurisdiction. Any residues of these agents on a surface which may come in contact with food should be removed by thorough rinsing with water, in compliance with sub-section 7.3 of the *General Principles of Food Hygiene* (CAC/RCP 1-1969) referred to in sub-section 4.4.1.1, before the area or equipment is again used for handling food.

5.2.4 Either immediately after cessation of work for the day or at such other times as may be appropriate, floors, including drains, auxiliary structures and walls of food handling areas should be thoroughly cleaned.

5.2.5 Changing facilities and toilets should be kept clean at all times.

5.2.6 Roadways and yards in the immediate vicinity of and serving the premises should be kept clean.

5.3 **Hygiene Control Programme**

A permanent cleaning and disinfection schedule should be drawn up for each establishment to ensure that all areas are appropriately cleaned and that critical areas, equipment and material are designated for special attention. A single individual who should preferably be a permanent member of the staff of the establishment and whose duties should be independent of production, should be appointed to be responsible for the cleanliness of the establishment. He should have a thorough understanding of the significance of contamination and the hazards involved. All cleaning personnel should be well-trained in cleaning techniques.

5.4 **By-Products**

By-products should be stored in such a manner as to avoid contamination of food. They should be removed from the working areas as often as necessary and at least daily .

5.5 **Storage and Disposal of Waste**

Waste material should be handled in such a manner as to avoid contamination of food or potable water. Care should be taken to prevent access to waste by pests. Waste should be removed from the food handling and other working areas as often as necessary and at least daily. Immediately after disposal of the waste, receptacles used for storage and any equipment which has come into contact with the waste should be cleaned and disinfected. The waste storage area should also be cleaned and disinfected.

5.6 **Exclusion of Domestic Animals**

Animals that are uncontrolled or that could be a hazard to health should be excluded from establishments.

5.7 **Pest Control**

5.7.1 There should be an effective and continuous programme for the control of pests. Establishments and surrounding areas should be regularly examined for evidence of infestation.

5.7.2 Should pests gain entrance to the establishment, eradication measures should be instituted. Control measures involving treatment with chemical, physical or biological agents should only be undertaken by or under direct supervision of personnel who have a thorough understanding of the potential hazards to health resulting from the use of these agents, including those hazards which may arise from residues retained in the product. Such measures should only be carried out in accordance with the recommendations of the official agency having jurisdiction.

5.7.3 Pesticides should only be used if other precautionary measures cannot be used effectively. Before pesticides are applied, care should be taken to safeguard all food, equipment and utensils from contamination. After application, contaminated equipment and utensils should be thoroughly cleaned to remove residues prior to being used again.

5.8 Storage of Hazardous Substances

5.8.1 Pesticides or other substances which may represent a hazard to health should be suitably labelled with a warning about their toxicity and use. They should be stored in locked rooms or cabinets used only for that purpose and dispensed and handled only by authorized and properly trained personnel or by persons under strict supervision of trained personnel. Extreme care should be taken to avoid contaminating food.

5.8.2 Except when necessary for hygienic or processing purposes, no substance which could contaminate food should be used or stored in food handling areas.

5.9 Personal Effects and Clothing

Personal effects and clothing should not be deposited in food handling areas.

6. PERSONNEL HYGIENE AND HEALTH REQUIREMENTS

6.1 Hygiene Training

Managers of establishments should arrange for adequate and continuing training of all food handlers in hygienic handling of food and in personal hygiene so that they understand the precautions necessary to prevent contamination of food. Instruction should include relevant parts of this Code.

6.2 Medical Examination

Persons who come into contact with food in the course of their work should have a medical examination prior to their employment if the official agency having jurisdiction, acting on medical advice, considers that this is necessary, either because of epidemiological considerations, the nature of the food prepared in a particular establishment or the medical history of the prospective food handler. Medical examination of a food handler should be carried out at other times when clinically or epidemiologically indicated.

6.3 Communicable Diseases

The management should take care to ensure that no person, while known or suspected to be suffering from, or to be a carrier of a disease likely to be transmitted through food or while afflicted with infected wounds, skin infections, sores or with diarrhoea, is permitted to work in any food handling area in any capacity in which there is any likelihood of such a person directly or indirectly contaminating food with pathogenic micro-organisms. Any person so affected should immediately report to the management that he is ill.

6.4 Injuries

Any person who has a cut or wound should not continue to handle food or food contact surfaces until the injury is completely protected by a waterproof covering which is firmly secured, and which is conspicuous in colour. Adequate first-aid facilities should be provided for this purpose.

6.5 Washing of Hands

Every person, while on duty in a food handling area should wash his hands frequently and thoroughly with a suitable hand-cleaning preparation under running warm water which should be in accord with the Sub-Section 7.3 of the *General Principles of Food Hygiene* (CAC/RCP 1-1969) referred to in Sub-Section 4.4.1.1 of this Code. Hands should always be washed before commencing work, immediately after using the toilet, after handling contaminated material and whenever else necessary. After handling any material which might be capable of transmitting disease, hands should be washed and disinfected immediately. Notices requiring hand-washing should be displayed. There should be adequate supervision to ensure compliance with this requirement.

6.6 Personal Cleanliness

Every person engaged in a food handling area should maintain a high degree of personal cleanliness while on duty, and should at all times while so engaged wear suitable protective clothing including head covering and footwear, all of which articles should be cleanable unless designed to be disposed of and should be maintained in a clean condition consistent with the nature of the work in which the person is engaged. Aprons and similar items should not be washed on the floor. During periods where food is manipulated by hand, any jewellery that cannot be adequately disinfected should be removed from the hands. Personnel should not wear any insecure jewellery when engaged in food handling.

6.7 Personal Behaviour

Any behaviour which could result in contamination of food, such as eating, use of tobacco, chewing (e.g. gum, sticks, betel nuts, etc.) or unhygienic practices such as spitting, should be prohibited in food handling areas.

6.8 Gloves

Gloves, if used in the handling of food products, should be maintained in a sound, clean and sanitary condition. The wearing of gloves does not exempt the operator from having thoroughly washed hands.

6.9 Visitors

Precautions should be taken to prevent visitors to food handling areas from contaminating food. These may include the use of protective clothing. Visitors should observe the provisions recommended in Sub-Sections 5.9, 6.3, 6.4 and 6.7.

6.10 Supervision

Responsibility for ensuring compliance by all personnel with all requirements of Sub-Sections 6.1 - 6.9 inclusive should be specifically allocated to competent supervisory personnel.

7. ESTABLISHMENT: HYGIENIC PROCESSING REQUIREMENTS

7.1 Raw Material Requirements

7.1.1 Acceptance criteria

Groundnuts should not be accepted by the plant if known to contain decomposed, toxic, or extraneous substances which will not be reduced to acceptable levels by normal plant procedures, sorting or preparation. Particular care should be taken to avoid contaminating in-shell groundnuts or shelled nut meats with animal or human faecal material; nuts suspected of being contaminated should be rejected for human consumption. Special precautions must be taken to reject nuts showing signs of insect damage or mould growth because of the danger of their containing mycotoxins such as aflatoxins. Aflatoxin test results should be known before allowing lots of raw groundnuts to be processed. Any lot of raw groundnuts with an unacceptable level of aflatoxins, which cannot be reduced to permitted levels by the available sorting equipment, should not be accepted.

Progressively more accurate decisions on accepting or rejecting may be made according to the following chart (see page 94).

7.1.2 Storage

Raw materials stored on the plant premises should be maintained under conditions that will protect against contamination and infestation and minimize deterioration. Groundnuts not scheduled for immediate use should be stored under conditions that prevent infestation and mould growth (see Sub-Section 3.4.2).

The warehouse should be of sound construction, in good repair and built and equipped so that it will provide suitable storage and adequate protection for groundnuts. All break, or openings in the walls, floors, or roof shall have been repaired. Any breaks or openings around doors, windows and eaves shall have been repaired or screened. Screens should be used only in those areas of the building where moisture entry from precipitation cannot occur. The building should have sufficient ventilation to prevent accumulation of moisture where it can condense and wet the groundnuts. Provision should be made in existing storages or at the design stage in new storages for gas tightness to permit *in situ* fumigation of peanuts.

Area with new concrete floors or walls should not be used for storage until it is absolutely certain that the new concrete is well-cured and free of excess water. For the first year it is safest to use an approved plastic cover spread over the entire new concrete floor as a moisture barrier prior to use for groundnuts. However, other means of protecting the groundnuts against moisture from "sweating" of concrete can be used, such as stacking of containers on pallets. The plastic can be removed when the warehouse is emptied. This system will protect against moulding of the groundnuts due to sweating of new concrete.

Products which affect the storage life, quality or flavour of groundnuts should not be stored in the same room or compartment as groundnuts. For example, such items as fertilizer, gasoline or lubricating oils should not be stored with groundnuts, and some fruits or vegetables contribute objectionable odours or flavours.

7.2 Inspection and Sorting

Prior to introduction into the processing line, or at a convenient point within it, raw materials should be inspected, sorted or culled as required to remove unfit materials (see Sub-Sections 3.4.2 and 3.4.6).

Experience has shown that aflatoxin is most frequently associated with mouldy, discoloured, shrivelled, insect damaged or otherwise damaged groundnuts. Mould contaminated groundnuts may exhibit some of the following characteristics:

- (a) Darker skin colouring before and/or after roasting.
- (b) Darker flesh (after blanching) before and/or after roasting.
- (c) Resistance to splitting and/or blanching.

To remove mould-contaminated nuts effectively, sorting should be performed before and after blanching and roasting. Where splitting is part of the processing operation, nuts that resist splitting should be removed. The effectiveness of sorting techniques should be checked by regular aflatoxin analyses of the sorted groundnuts stream or of the finished product, or both. This should be done frequently enough to give assurance that the product is completely acceptable.

Rejected groundnuts from the sorting procedure (pickouts) should be destroyed or segregated from edible products. If they are to be used for crushing, they should be separately bagged and tagged as unsuitable for direct human or animal consumption in their present state.

7.3 Prevention of Cross-Contamination

7.3.1 Effective measures should be taken to prevent contamination of food material by direct or indirect contact with material at an earlier stage of the process.

7.3.2 Persons handling raw materials or semi-processed products capable of contaminating the end-product should not come into contact with any end-product unless and until they discard all protective clothing worn by them during the handling of raw materials or semi-processed products which have come into contact with or have been soiled by raw material or semi-processed products and they have changed into clean protective clothing.

7.3.3 If there is a likelihood of contamination, hands should be washed thoroughly between handling products at different stages of processing.

7.3.4 All equipment which has been in contact with raw materials or contaminated material should be thoroughly cleaned and disinfected prior to being used for contact with end-products.

7.4 Use of Water

7.4.1 As a general principle only potable water as defined in the latest edition of "International Standards of Drinking Water" (WHO) should be used in food handling.

7.4.2 Non-potable water may be used with the acceptance of the official agency having jurisdiction for steam production, refrigeration, fire control and other similar purposes not connected with food. However, non-potable water may, with specific acceptance by the official agency having jurisdiction, be used in certain food handling areas provided this does not constitute a hazard to health.

7.4.3 Water re-circulated for re-use within an establishment should be treated and maintained in a condition so that no health hazard can result from its use. The treatment process should be kept under constant surveillance. Alternatively, re-circulated water which has received no further treatment may be used in conditions where its use would not constitute a health hazard and will not contaminate either the raw material or the end-product. Re-circulated water should have a separate distribution system which can be readily identified. The acceptance of the official agency having jurisdiction should be required for any treatment process and for the use of re-circulated water in any food process.

7.5 Processing

7.5.1 Processing should be supervised by technically competent personnel.

7.5.2 All steps in the production process, including packaging, should be performed without unnecessary delay and under conditions which will prevent the possibility of contamination, deterioration, or the development of pathogenic and spoilage microorganisms.

7.5.3 Rough treatment of containers should be avoided to prevent the possibility of contamination of the processed product.

7.5.4 Methods of preservation and necessary controls should be such as to protect against contamination or development of a public health hazard and against deterioration within the limits of good commercial practice.

7.6 Packaging

7.6.1 All packaging material should be stored in a clean and sanitary manner. The material should be appropriate for the product to be packed and for the expected conditions of storage and should not transmit to the product objectionable substances beyond the limits acceptable to the official agency having jurisdiction. The packaging material should be sound and should provide appropriate protection from contamination.

7.6.2 Product containers should not have been used for any purpose which may lead to contamination of the product. Where practicable containers should be inspected immediately before use to ensure that they are in a satisfactory condition and where necessary cleaned and/or disinfected; when washed they should be well drained before filling. Only packaging material required for immediate use should be kept in the packing or filling area.

7.6.3 Packing should be done under conditions that preclude the introduction of contamination into the product.

7.6.4 Lot identification

Each container shall be permanently marked in code or in clear to identify the producing factory and the lot. A lot is a quantity of food produced under identical conditions, all packages of which should bear a lot number that identifies the production during a particular time interval, and usually from a particular "line" or other critical processing unit.

7.6.5 Processing and production records

Permanent, legible and dated records of pertinent processing and production details should be kept concerning each lot. These records should be retained for a period that exceeds the shelf life of the product, but unless a specific need exists they need not be kept for more than two years. Records should also be kept of the initial distribution by lot.

7.7 Preservation of Product

In-shell nuts or shelled nuts (nut meats) should be stored at a moisture level low enough so that the product can be held under normal storage conditions without development of mould or significant deterioration by oxidative or enzymatic changes. Finished products may be treated with antioxidants at levels approved by the Codex Alimentarius Commission and packed in gas tight containers under nitrogen or vacuum to protect quality and retard possible mould growth.

7.8 Storage and Transport of End-Product

Groundnuts should be stored and transported under such conditions as will maintain the integrity of the container and the product within it. Carriers should be clean, dry, weatherproof, free from infestation and sealed to prevent water, rodents or insects from reaching the peanuts. Groundnuts should be loaded, held and unloaded in a manner that protects from damage or water. Well insulated carriers or refrigerated vehicles are recommended for transport when climatic conditions indicate such a need. Extreme care should be taken to prevent condensation when unloading groundnuts from cold storage or from a refrigerated vehicle. In warm, humid weather, the groundnuts should be allowed to reach ambient temperature before exposure to external conditions. This tempering may require 1-3 days. Groundnuts that have been spilled are vulnerable to contamination and should not be used for edible products.

7.8.1 All products should be stored in clean, dry buildings, protected from insects, mites and other arthropods, rodents, birds, or other vermin, chemical or microbiological contaminants, debris and dust.

7.8.2 Controlled storage conditions

7.8.2.1 Control of mould growth

An environment with a relative humidity between 55% and 65% should be maintained to protect quality and prevent mould growth. A single water activity value may correspond to different moisture levels in different varieties of groundnuts. Producing countries should therefore determine for each of their own varieties of groundnuts, the moisture level that corresponds to the safe water activity value given in the Code. These moisture levels can then be used as local standards for field control. No groundnuts should be stored closer than 0.5 metres (1½ feet) from any outside wall. An active programme should be maintained to detect and control hazards from damp pallets, damp floors and walls, overhead moisture during storage, condensation, wet

unloading and loading out conditions - all conducive to moisture pick-up and mould. Growth of toxigenic moulds may be prevented by packing nut products that have been dried to a "safe water activity" or by storing at a temperature sufficiently low to prevent mould growth. Exposed nut products in storage may be maintained at or dried to a "safe water activity" by control of the relative humidity of the circulating air. Those who use refrigerated storage should be aware that the water activity of nuts increases with increased temperature; this fact should be taken into account when changing storage temperatures. If the storage temperature of groundnuts is changed, e.g., cold groundnuts transferred to an area of high humidity or vice versa, care should be taken to see that moisture does not condense on the groundnuts.

7.8.2.2 Control of infestation by insects, mites and other arthropods.

Groundnuts should be stored in such a manner that infestation can be controlled by such methods as anaerobic or refrigerated storage or fumigation prior to storage.

Stored groundnuts should be inspected regularly and, if infested, fumigated by appropriate methods. If necessary they can be removed for fumigation. In this case the storage areas should be separately cleaned and disinfected.

7.9 Sampling and Laboratory Control Procedures

7.9.1 In addition to any control by the official agency having jurisdiction, it is desirable that each plant should have its own or contracted laboratory control of the hygienic quality of the nut products processed and of the pest control procedures. The amount and type of such control will vary with the different nut products as well as the needs of management. Such control should provide for rejection of all nuts that are unfit for human consumption and monitoring of the quality of the finished products.

7.9.2 Where appropriate, representative samples of the production should be taken to assess the safety and quality on the product.

7.9.3 Laboratory procedures used should preferably follow recognized or standard methods in order that the results may be readily interpreted.

8. END-PRODUCT SPECIFICATIONS

Standard methods should be used for sampling, analysis and other determinations to meet the following specifications:

8.1 To the extent possible in good manufacturing practice the products should be free from objectionable matter and should not contain any substance in amounts which may represent a hazard to health.

8.2 When tested by appropriate methods of sampling and examination, the products:

- (a) should be free from pathogenic micro-organisms in amounts which may represent a hazard to health; and

- (b) should not contain any substances originating from micro-organisms, particularly aflatoxin, in amounts which exceed the tolerances or criteria established by the official agency having jurisdiction.

8.3 The products should comply with the provisions for food additives and contaminants laid down in Codex Commodity Standards and with maximum levels for pesticide residues recommended by the Codex Alimentarius Commission.



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**Maksimum Residu Vlak Bestuur: Grondbone
Suid Afrika, EU en Japan
(July 2012)**

**Maximum Residue Level Management: Groundnuts
South Africa, EU & Japan
(July 2012)**

MAXIMUM RESIDUE LEVELS FOR CROP PROTECTION PRODUCTS ON PEANUTS - SOUTH AFRICA, EUROPE & JAPAN – JULY 2012

Disclaimer: The information in this report is derived from sources which are regarded as generally accurate and reliable. It is of a general nature only and may not be applicable to all circumstances. No responsibility for any error, omission or loss sustained by any person acting or refraining from acting as a result of this report is accepted by the SA Groundnut Forum, Grain SA, PPECB, CropLife South Africa, DAFF, ARC, selection operators or exporters.

BACKGROUND TO MAXIMUM RESIDUE LEVELS

The data generated from residue trials are used to calculate Maximum Residue Levels (MRL's). The definition of an MRL is: "The maximum concentration of a crop protection product legally permitted in or on food, agricultural commodities or animal foodstuffs." The main purpose of an MRL is to allow crops a legal trading limit. It does not reflect the toxicity of the product, however, it serves as a check that the crop protection product has been used according to Good Agricultural Practice (GAP). MRL's are also known as "Tolerances", in some countries, e.g., the USA.

The MRL is expressed as milligram of residue in a kilogram of commodity/crop, or parts per million (mg/kg or ppm). Residue studies are designed to give a worst case scenario of residue left in the crop. In residue trials, the crop protection product is applied in such a way as to give the maximum benefit to the crop; this will in turn also give the maximum possible residue from the proposed use. This maximum level of residue is produced by applying the highest proposed dose rate, the maximum proposed number of applications and the shortest practicable time between the last application and the crop being harvested. The above conditions are called "Critical Good Agricultural Practice" (cGAP) and will always provide the highest level of residue that could be expected. However, it is important to remember that these conditions are rarely encountered in the field and, depending upon pest, disease or weed pressure, most growers will need to use less than the permitted number of treatments on the crop, at a timing earlier than the last permitted opportunity and often at less than the highest proposed rate. Under these conditions, significantly lower residues will result, as compared to those obtained under cGAP.

This document lists chemicals that are registered for use on groundnuts in South Africa and indicates the MRL's for South Africa, the European Union and Japan. Where possible, PHI's have also been included (a PHI, or Pre-harvest Interval, is the period that should elapse between the final application and harvest). In many cases MRL's do not exist for all the markets and are indicated as NL (Not Listed). In these cases the reader will have to check with local suppliers as to the Agricultural Practice that needs to be followed in order for residues to be below the LOD (Limit of Determination), i.e, undetectable. The reasons for setting an MRL at the LOD are explained in World Trade Organization Document "Questions and Answers on the Procedure to obtain Import Tolerances and the Inclusion of Active Substances for Plant Protection uses in the European Communities List" - Ref G/SPS/GEN/557 dated 29 March 2005 (<http://docsonline.wto.org/?language=1>).

Apart from the active ingredients listed in this document, various other chemicals are mentioned in official and unofficial lists of MRL's in South Africa and elsewhere, but these are not registered for use on groundnuts / peanuts in this country and may therefore not be used on this crop.

Details of MRL's and PHI's appear in the following tables:

- Table 1: Fungicides
- Table 2: Insecticides and nematicides
- Table 3: Herbicides
- Table 4: Post-harvest storage products

Table 1 Fungicide products registered for use on South African Peanuts, plus MRL's for RSA and MRL's (Import Tolerances) for the EU and Japan. □

Active ingredient	Disease	South Africa		Europe		Japan		Limit Of Determination (LOD)
		MRL (ppm) / mg/kg	PHI (days)	MRL (ppm) / mg/kg	PHI (days)	MRL (ppm) / mg/kg	PHI (days)	
azoxystrobin / chlorothalonil	early leaf spot, web blotch	0.01/ 0.1	28	0.2/ 0.1	28	0.2/ 0.05	>28 Consult supplier	0.01/ 0.01
azoxystrobin / difenoconazole	early leaf spot, web blotch	0.01/ 0.05	28	0.2/ 0.05	28	0.2/ 0.1	28	0.01/ 0.05
benomyl	leaf blotch	0.1	42	0.1	42	0.6	42	0.1
bitertanol	leaf spot, leaf blotch, rust	0.05	42	0.1	42	0.1	42	0.1
carbendazim / difenoconazole	early leaf spot, late leaf spot, web blotch, rust, grey mould	0.1/ 0.05	21	0.1/ 0.05	21	0.6/ 0.1	21	0.1/ 0.05
carbendazim / epoxiconazole	early leaf spot, rust, leaf blotch	0.1/ NL	56	0.1/ 0.05	56	0.6/ NL	56	0.1/ 0.05
carbendazim / flusilazole	leaf spot, leaf blotch, Botrytis stem rot, rust	0.1/ 0.05	42	0.1/ 0.02	>42 Consult supplier	0.6/ NL	42	0.1/ 0.02
chlorothalonil	leaf spot, Botrytis rot	0.1	42	0.1	42	0.05	>42 Consult supplier	0.01
dichlorophen	leaf spot, Phoma	0.05	42	NL	42	NL	42	NL
difenoconazole	leaf spot, rust, web blotch	0.05	21	0.05	21	0.1	21	0.05
mancozeb (dithio-carbamates)	leaf spots	0.05	21	0.1	21	0.1	21	0.1
maneb (dithio-carbamates) /zinc oxide	leaf spot, late leaf spot, web blotch, rust	0.05/ NL	21	0.1/ NL	21	0.1/ NL	21	0.1/ NL
propineb (dithio-carbamates)	Cercospora leaf spot	0.5	21	0.1	>21 Consult supplier	0.1	>21 Consult supplier	0.1
tebuconazole	late leaf spot, leaf blotch, rust	0.05	42	0.05	42	0.1	42	0.05
thiram	crown rot, seed decay	NL	Seed tmt	0.1	Seed tmt	NL	Seed tmt	0.1

□

IMPORTANT NOTES:

- Only products (formulations) registered under Act no 36 of 1947 may be used and product label prescriptions should always be followed in accordance with the Act.
- NL = No MRL is listed in the country. **In these cases the MRL will default to Level of Determination (LOD).**
- In addition to production and storage chemicals, care should be taken to use only cleaning and sanitation products acceptable in terms of GAP, GMP and GDP requirements.
- Always follow requirements of published Food Safety legislation, including GAP, GMP and GDP.

Table 2. Insecticide and nematicide products registered for use on South African Peanuts, plus MRL's for RSA and MRL's (Import Tolerances) for the EU and Japan.*

Active ingredient	Pest	South Africa		Europe		Japan		Limit Of Determination (LOD)
		MRL (ppm) / mg/kg	PHI (days)	MRL (ppm) / mg/kg	PHI (days)	MRL (ppm) / mg/kg	PHI (days)	
aldicarb (reg cancelled Dec. 2011)	nematodes	0.1	See below	0.05	See below	0.05	See below	0.05
alpha-cypermethrin	american bollworm, cutworm	0.05	7	0.1	7	NL	7	0.05
beta-cypermethrin	american bollworm	0.05	7	0.1	7	NL	7	0.05
cypermethrin	american bollworm	0.05	7	0.1	7	0.05	7	0.05
deltamethrin	american bollworm	0.05	7	0.05	7	0.1	7	0.05
demeton-S-methyl	aphid	0.1	21	0.01	>21 Consult supplier	0.05	>21 Consult supplier	0.01
dimethoate	aphids	0.1	14	0.05	>14 Consult supplier	1	14	0.05
endosulfan (reg. cancelled May 2012)	american bollworm	0.2	See below	0.1	See below	0.5	See below	0.1
fenamiphos	nematodes	0.05	63	0.02	>63 Consult supplier	0.05	63	0.02
furfural	nematodes	0.01	28	1	28	NL	28	0.01
gamma-cyhalothrin	american bollworm	NL	Consult supplier	NL	Consult supplier	0.2	Consult supplier	NL
lambda-cyhalothrin	american bollworm	0.05	Consult supplier	0.2	Consult supplier	0.2	Consult supplier	0.02
mercaptotion (malathion)	aphids	8	7	0.02	>>7 Consult supplier	8	7	0.02
mercaptotion (malathion)/ pyrethrins	aphids	8.0/1.0	Consult supplier	0.02/ 3.0	Consult supplier	8.0/ 1.0	Consult supplier	0.02/ NL
omethoate	thrips	0.1	21	0.05	>21 Consult supplier	1	21	NL
oxamyl	nematodes	0.05	80	0.02	80	0.1	80	0.02
oxydemeton-methyl	aphids	0.1	21	0.01	>21 Consult supplier	0.05	>21 Consult supplier	0.01
permethrin	american bollworm	0.05	7	0.05	7	0.1	7	0.05
pirimicarb	aphids	0.05	21	0.1	21	NL	21	NL
terbufos	various soil pests	0.1	90	0.01	>90 Consult supplier	0.05	>90 Consult supplier	0.01
thiometon	aphids	0.05	28	NL	>28 Consult supplier	0.02	>28 Consult supplier	NL
tralomethrin	american bollworm	0.05	7	NL	7	0.1	7	NL
zeta-cypermethrin	american bollworm	0.05	7	0.1	7	NL	7	0.05

Additional Information:

- Endosulfan and aldicarb registrations have been withdrawn/cancelled in most countries including RSA. Producers are advised not to use these products on export crops.

*

*IMPORTANT NOTES:

- Only products (formulations) registered under Act no 36 of 1947 may be used and product label prescriptions should always be followed in accordance with the Act.
- NL = No MRL is listed in the country. **In these cases the MRL will default to Level of Determination (LOD).**
- In addition to production and storage chemicals, care should be taken to use only cleaning and sanitation products acceptable in terms of GAP, GMP and GDP requirements.
- Always follow requirements of published Food Safety legislation, including GAP, GMP and GDP.

Table 3. Herbicide products registered for use on South African Peanuts, plus MRL's for RSA and MRL's (Import Tolerances) for the EU and Japan.[□]

Active ingredient	South Africa		Europe		Japan		Limit Of Determination (LOD)
	MRL (ppm) / mg/kg	PHI (days)	MRL (ppm) / mg/kg	PHI (days)	MRL (ppm) / mg/kg	PHI (days)	
acetochlor	0.02	See note	0.01	See note	NL	See note	0.01
alachlor	0.05	See note	0.1	See note	0.05	See note	0.1
bendioxide/ bentazone	NL	See note	0.1	See note	0.05	See note	0.1
cycloxydim	0.5	35	0.2	>35 Consult supplier	0.05	>35 Consult supplier	NL
diclosulam	NL	See note	NL	See note	0.02	See note	0.01
dimethenamid-p / s-dimethenamid	NL	See note	0.02	See note	0.01	See note	0.02
fluzafop-P-butyl	NL	40	0.5	40	5	40	NL
flumetsulam	NL	28	NL	28 Consult supplier	0.05	28 Consult supplier	NL
flumioxazin	NL	See note	0.1	See note	0.02	See note	0.05
fomesafen	0.05	56	0.02	>56 Consult supplier	NL	>56 Consult supplier	0.01
haloxyfop-R-methyl	2	40	0.05	>40 Consult supplier	0.05	>40 Consult supplier	NL
imazethapyr	0.05	85	NL	85	0.1	85	NL
metazachlor	0.05	See note	0.1	See note	NL	See note	0.1
metolachlor / metholachlor	0.05	See note	0.1	See note	0.2	See note	0.1
pendimethalin	NL	See note	0.1	See note	0.2	See note	0.1
propaquizafop	NL	40	0.05	>40 Consult supplier	0.05	>40 Consult supplier	0.05
quizalofop-P-ethyl	0.2	24	0.1	>24 Consult supplier	0.1	>24 Consult supplier	0.1
quizalofop-P-tefuryl	NL	See note	0.1	See note	NL	See note	0.1
sethoxydim	1	See note	NL	See note	25	See note	NL
s-metolachlor / metholachlor-s	NL	See note	0.1	See note	NL	See note	NL
terbutryn	0.05	See note	NL	See note	NL	See note	NL
trifluralin	0.05	See note	0.15*	See note	0.15	See note	NL

Additional Information:

- Most herbicide active ingredients either do not have set Withholding Periods (PHI's) or MRL's, or MRL's are set at LOD. This is mainly due to the Agricultural Practice, i.e., pre-plant or early post-plant applications leading to no detectable residue at harvest.
- *The EU MRL for trifluralin is expected to be lowered to 0.02 ppm (LOD), but this was not yet in force on 6 July 2012.

□

*IMPORTANT NOTES:

- Only products (formulations) registered under Act no 36 of 1947 may be used and product label prescriptions should always be followed in accordance with the Act.
- NL = No MRL is listed in the country. **In these cases the MRL will default to Level of Determination (LOD).**
- In addition to production and storage chemicals, care should be taken to use only cleaning and sanitation products acceptable in terms of GAP, GMP and GDP requirements.
- Always follow requirements of published Food Safety legislation, including GAP, GMP and GDP.

Table 4. Post harvest Storage products registered for use on South African Peanuts, plus MRL's for RSA and MRL's (Import Tolerances) for the EU and Japan.*

Active ingredient	Pest	South Africa	Europe	Japan	Limit Of Determination (LOD)
		MRL (ppm) / mg/kg	MRL (ppm) / mg/kg	MRL (ppm) / mg/kg	
Aluminium phosphide. Residues as phosphine (hydrogen phosphide)	Pests of stored product	0.01	0.05	0.1	0.01
deltamethrin	Pests of stored product	0.05	0.05	0.1	0.05
Magnesium phosphide. Residues as phosphine (hydrogen phosphide)	Pests of stored product	0.01	0.05	0.1	0.01
permethrin	Pests of stored product	0.05	0.05	0.1	0.05
piperonyl butoxide	Pests of stored product	10	NL	1	NL
pyrethrins	Pests of stored product	1	3	1	NL

Additional Information:

- Fumigation is the process of killing insects with a toxic gas, phosphine (PH₃) being the most commonly used. Phosphine concentration and exposure time are both important in killing insects, but time is more important than concentration. Phosphine treatment involves 5-14 days under fumigation, followed by 2-5 days ventilation and a further two days withholding period. The overall fumigation can take up to 21 days where kernel temperature is below 25°C and fans are not used to purge the gas during venting. Fumigated grain must be vented for the required time before it can be legally transported.
- All other insecticides used in storage facilities e.g. pyrethroids, must comply with the importing country's legislation. Refer to Table 2 for specific import tolerances set for these products.

*IMPORTANT NOTES:

- Use of chemical products (fumigation or otherwise) should be managed according to the HACCP plan of the processing facility if not handled by the farmer. Chemical contamination from these products fall outside the scope of pre-farm gate control points and care should be taken when following label instructions to ensure ventilation after treatment. In all cases NO RESIDUE is allowed to remain.
- Only products (formulations) registered under Act no 36 of 1947 may be used and product label prescriptions should always be followed in accordance with the Act.
- NL = No MRL is listed in the country. **In these cases the MRL will default to Level of Determination (LOD).**
- In addition to production and storage chemicals, care should be taken to use only cleaning and sanitation products acceptable in terms of GAP, GMP and GDP requirements.
- Always follow requirements of published Food Safety legislation, including GAP, GMP and GDP.

Registration: GAP Audit Guideline

To: The Chairperson
South African Groundnut Forum
Email: oliesade@worldonline.co.za
Fax: 011 234 3402 / 086 634 8067

Dear Sir

Please register me for updated publications of the GAP Audit Guideline document:

Name: _____

Business/Farm Name: _____

District: _____

Send notice of updates to:

Email: _____

or

Fax: _____



REFERENCES:

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